CIPEC

Canadian Industry Program for Energy Conservation

Industrial Competitiveness through Energy Efficiency

1994 - 1995

Annual Report

CIPEC

December 15, 1995

The Honorable A. Anne McLellan
Minister of Natural Resources
Ottawa, Ontario K1A 0A6

Dear Minister

I am pleased to enclose CIPEC's 1994-1995 Annual Report.

This report provides clear, credible proof that, within the manufacturing and mining sectors, the voluntary approach to the Climate Change Challenge is working. More particularly, the report demonstrates that Canadian industry is making a strong contribution to stabilizing carbon dioxide emissions at 1990 levels by 2000.

I look forward to discussing our annual report with you and to exploring how we can build on our working relationship in the years ahead.

Yours sincerely,

Charles H. Hantho

Charles H. Hantho
Chairman, CIPEC Policy Board

100-07317/

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Highlights

Manufacturing and mining (industry) companies continued to make significant improvements in energy efficiency per unit of production and carbon dioxide emissions from stationary sources in 1994-1995, including:

- 178 companies, representing more than 65 per cent of all industrial energy use, qualified as Industrial Energy Innovators
- target setting by individual industrial sectors has confirmed the 1994 commitment to improve industrial energy efficiency per unit of production by one per cent a year from 1995 to 2000 - an integral part of industry's undertaking to stabilize carbon dioxide emissions at 1990 levels by 2000
- substantial fuel substitution and/or energy efficiency gains have been achieved by most of the major industrial energy using sectors
- two new industrial sector task forces have been established. In total, there are now 14 in place. As a result, there is now greater focus of effort, better verification of industry data, and encouragement of related sector companies to broaden their commitment
- Letters of Cooperation (LOC) have been signed with 15 major industrial trade associations and four individual companies in the food and beverage sectors
- Statistic Canada's (StatsCan) Industrial Consumption of Energy (ICE) Survey has been revised and enhanced to more than double the sample size, thereby increasing its accuracy
- industry's share of total Canadian energy use fell 1.25 percentage points between 1990 and 1994, even though industrial Gross Domestic Product (GDP) grew by 4.8 per cent over the same period
- industrial energy consumption between 1990 and 1994 grew only 3.1 per cent while total Canadian energy consumption grew by 9.2 per cent
- industrial energy intensity (industrial energy use divided by industrial GDP) fell by 0.3 per cent between 1990 and 1994
- industrial carbon dioxide intensity (carbon dioxide emissions divided by industrial GDP) fell by 5.9 per cent since 1990, an average of 1.5 per cent a year
- in 1994, carbon dioxide emissions were 1.4 per cent, or 1,350 kilotonnes of carbon dioxide, below 1990 levels, primarily because of improved energy efficiency, fuel switching from coal to natural gas and to biomass. By contrast, overall, Canada's carbon dioxide emissions increased by 4.7 per cent over this period
- confirmation that industry can achieve 1990 levels of carbon dioxide emissions by the year 2000, assuming industrial GDP grows at or below 2 per cent a year between 1995 and 2000
- in 1994, seven industrial sectors, as a group, exported 1,133 petajoules of embodied energy and 22,100 kilotonnes of related embodied carbon dioxide emissions.

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Definitions

Industry

Industry is defined as those companies in the manufacturing and mining sectors.

Industrial Energy,

Industrial energy is energy used in stationary sources to produce manufactured and mined products, including:

- purchased and non-purchased fuels - net electricity, natural gas, coal, liquid natural gas, steam, coke, coke oven gas, all petroleum products (light fuel oil, and kerosene), (heavy fuel oil, diesel fuel oil, petroleum coke and still gas)
- petroleum refining own use of refined petroleum products
- biomass fuel (pulping liquor and wood waste). See Appendices 1 and 2.

Total Canadian Energy Demand

Includes:

- the energy demand of the residential, transportation, commercial and industrial sectors
- non-energy use (feedstocks, asphalt, lubricants and greases, etc.)
- own use (refined petroleum products (RPP's), electricity, gas pipeline, coal, natural gas liquids, etc.)
- conversion losses in electricity generation, steam generation, etc.

Total Canadian Carbon Dioxide Emissions

Includes carbon dioxide emissions associated with:

- the consumption of all fuels in each sector (industrial, residential, commercial and transportation);
- power generation and steam generation;
- non-energy use;
- all own-use.

Total Industrial Carbon Dioxide Emissions

Includes carbon dioxide emissions associated with

- the combustion of all fuels listed in total industrial energy definition above except for electricity which is entirely allocated to utilities and biomass
- petroleum refining's own consumption of RPP's as described above

Industrial Sector Energy Efficiency

Energy use of companies in an industrial sector divided by units of production chosen by that sector to measure its performance.

Industrial Sector Energy Intensity

Energy use of companies in an industrial sector divided by value of production in that sector expressed in 1986 dollars.

Base Year

1990 is the base year from which the energy efficiency or energy intensity performance of industrial companies is measured for the period 1991 through 1994.

Calculation of the Ten Year Period 1990 to 2000

The ten year period - 1990 to 2000 - is calculated from January 1, 1991 to December 31, 2000.

Industrial Gross Domestic Product (GDP)

Industrial GDP is defined as the output of manufacturing and mining industries.

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Executive Overview

CIPEC - Since 1975

CIPEC is a voluntary initiative of Canada's manufacturing and mining industries.

Created in 1975, participating companies reduced their energy use by over 26.2 per cent per unit of production between 1975 and 1990, for an annual on-going reduction of 30 megatonnes of carbon dioxide.

In 1992 CIPEC refocused in response to Canada signing the United Nations Framework Convention on Climate Change - the Rio Accord. More than 150 countries agreed to stabilize greenhouse gas emissions at 1990 levels by the year 2000 as a result of the Accord.

Through supporting industry associations, 3,000 companies are now involved in CIPEC, up from 700 during the 1975 to 1990 period. In 1994, industry contributed well over $1.5 million in time and effort involved in establishing industry sector energy efficiency targets, in reporting on their energy efficiency performance and in encouraging other companies to give priority to industrial energy efficiency. This is in addition to the millions of dollars industry invested in energy efficiency improvements.

The performance data contained in this report results from the combined efforts of CIPEC and its Sector Task Forces, StatsCan, NRCan and the Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC) operating out of Simon Fraser University, British Columbia.

In 1994, to increase the quality, reliability and suitability of the data, at the request of CIPEC and NRCan, StatsCan revised its Industrial Consumption of Energy (ICE) Survey. More than 700 industrial establishments, accounting for about 78 per cent of Canada's industrial energy use, were surveyed. The focus in this report is on the major industrial energy using sectors.

The number of industrial establishments included in the 1995 ICE survey will rise to almost 2,000, increasing its accuracy and scope.

Canadian Industrial Energy Consumption: 1990 - 1994

Canada's total energy consumption rose 9.2 per cent between 1990 and 1994, from 9,082 to 9,918 petajoules.

Industrial energy use increased 3.1 per cent between 1990 and 1994, from 2,598 to 2,679 petajoules. See Appendix 1.

Industrial GDP grew by 6.5 per cent in 1994 (in constant 1986 dollars), but the cumulative GDP growth over the period 1990 to 1994 was only 4.8 per cent, resulting in average annual growth of 1.2 per cent for the period.

Industry's share of total Canadian energy use fell 1.25 percentage points between 1990 and 1994.

Industrial Energy Performance: 1990 - 1994

Industrial energy intensity (industrial energy use divided by industrial GDP) improved slightly by 0.3 per cent.

Energy Consumption by Industry Sector: 1994

Seven sectors - pulp and paper, petroleum refining (petroleum products), smelting and refining, steel, chemicals, metal mining and cement - consumed just over 69 per cent of all the energy used by industrial companies in 1994. Between 1990 and 1994, energy consumption in these sectors increased by 1.6 per cent.

Three sectors - oilsands/upgrader, non-metal mining and glass - consumed another 9.0 per cent of total industrial energy. All other industrial sectors consumed the remaining 21 per cent.

Energy Efficiency by Industry Sector: 1990 - 1994

Of 10 industrial sectors for which energy efficiency information is available for the period 1990 to 1994, nine sectors demonstrate significant to moderate energy efficiency or energy intensity improvement.

It is expected that energy efficiency performance measures will be available for most industrial sectors for inclusion in the 1995/96 Annual Report.

Industrial Energy Innovator Initiative

178 companies, representing 65 percent of total industrial energy use, have become Industrial Energy Innovators and, as such, have committed to:

- implement energy efficiency measures that make good economic sense;
- review their energy efficiency performance annually; and
- furnish CIPEC with a brief annual review of their successes and/or achievements and, where possible, a copy of their action plans and specific energy efficiency improvement goals.

If requested, these companies were automatically registered as Industrial Energy Innovators in the Voluntary Challenge Registry (VCR). See Appendix 3 for a list of the Industrial Energy Innovators in each industry sector.

Industry Energy Efficiency Commitment: 1995 - 2000

14 industry sectors have established annual energy efficiency improvement targets for the period 1995 to 2000. They represent an aggregate total industry reduction in energy use per unit of production of one per cent each year over the period.

Exports of Embodied Energy: 1994

Canada is a major exporter of processed and semi processed natural resources. In 1994 seven of the largest industrial energy using sectors - petroleum refining, pulp and paper, steel, smelting and refining, chemicals, mining and cement - exported 1,133 petajoules of energy, or 61 per cent of their total energy consumption, in the form of embodied energy.

Canadian Carbon Dioxide Emissions: 1990 - 1994

Canada's total carbon dioxide emissions rose 4.7 per cent between 1990 and 1994, from 460,452 to 481,948 kilotonnes, an increase of 21,496 kilotonnes.

Industry's Share of Total Canadian Carbon Dioxide Emissions: 1990 - 1994

Canadian industry is now emitting 1.46 per cent less carbon dioxide than it did in 1990, even though, during the same period, industrial GDP grew by 4.8 per cent. This is primarily because of improved energy efficiency, fuel switching from coal (primarily to natural gas) and to biomass.

Industry's share of total Canadian carbon dioxide emissions has declined from 20.1 per cent in 1990 to 18.9 per cent in 1994.

Actual Carbon Dioxide and Projected Emissions to 2000: 1990 - 1994

If the 1990 to 1994 average annual decline in carbon dioxide intensity of 1.5 per cent is maintained between 1995 and 2000, and if the annual industrial GDP growth rate does not exceed 2 per cent, industry's carbon dioxide emissions in 2000 will exceed 1990 levels by only 1.6 per cent. CIPEC continues to believe, however, that with increased effort, industry will be successful in meeting its 1994 stabilization commitment.

Exports of Embodied Carbon dioxide Emissions: 1994

In 1994, seven industrial sectors exported over 42 per cent of the embodied carbon dioxide emissions contained in the products they sold abroad. This totaled some 22,100 kilotonnes of carbon dioxide.

Economic Greenhouse Emission Gas Emission Targets: Post 2000

The 1995 Berlin "Conference of Parties" established a process to negotiate new greenhouse gas emission targets for 2005, 2010, and 2020.

To begin to understand the impact which post-2000 greenhouse gas emission reductions might have on Canada, a study was undertaken to identify the potential "gap" between anticipated carbon dioxide emissions and four proposed targets:

- a 20 per cent reduction in carbon dioxide emissions from 1988 levels by 2005 (Toronto Conference)
- a 20 per cent reduction in carbon dioxide emissions from 1990 levels by 2005 (Alliance of Small Island States - AOSIS)
- a 10 per cent reduction from 1990 greenhouse gas emissions by 2010 (United Kingdom)
- the maintenance of 1990 greenhouse gas emission levels beyond 2000 (European Union)

The major findings of the study suggest that:

- achievement of carbon dioxide or total GHG emission targets below 1990 levels will require, either:
  - significantly lower annual Canadian industrial GDP growth rates, with attendant unemployment, increased government debt, and/or reduced government spending, or
  - compensating reductions in carbon dioxide emissions by other sectors of the economy: residential, transportation, commercial, agriculture, etc.
- three of the four proposed targets for reduced greenhouse gas emissions beyond 2000 can be achieved only if Canada experiences negative industrial GDP growth.
- the fourth target (i.e., European Union) can be achieved only with an annual industrial GDP growth rate of less than 1 per cent, assuming an annual industrial carbon dioxide intensity of 0.7 per cent for the period beyond 2000.

In view of the above, it becomes apparent that greenhouse gas emission targets are as much an economic, trade, jobs, standard of living, issue as it is an environmental issue. As such, Canada cannot afford to treat these international GHG negotiations lightly or as a single item agenda.

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Executive Overview

1994 / 1995 in Review

1994

October: Industry makes a preliminary commitment to the Minister of Natural Resources Canada to reduce its energy use per unit of production by 1 per cent a year from 1995 to 2000 and to have carbon dioxide emissions at 1990 levels by the year 2000, assuming the continuation of carbon dioxide emission reductions achieved from 1990 to 1992, and average industrial economic growth does not exceed 2 per cent a year.

November: Federal/Provincial Energy and Environment Ministers review a draft National Action Program on Climate Change.

December: StatsCan inaugurates a revised ICE Survey designed to more accurately measure the energy use of Canadian industry.

1995

February: Federal/Provincial Energy and Environment Ministers approve Canada's National Action Program on Climate Change.

March / April: Canada's National Action Program on Climate Change released.

Conference of Parties (COP 1), Berlin, Germany reviewed progress since the 1992 Rio Accord and confirmed that performance to date is inadequate to meet the long-term goals of the Accord. It established a process to negotiate reduction targets and timetables beyond the year 2000. Such targets would apply only to developed countries.

April to September: CIPEC Sector Task Forces review and confirm energy efficiency targets between 1995 and 2000.

August: Canada's Climate Change Voluntary Challenge and Registry (VCR) Participant's Handbook released and VCR launched.

1994 ICE Survey results available to CIEEDAC for further analysis.

September: Industrial Energy Innovator (IEI) Initiative inaugurated.

A Study is initiated to assess the potential industrial carbon dioxide emission gaps in the years 2005 and 2010 as measured against four proposed emission targets.

October: Environment Canada confirms that Canada's industrial companies produced 1.46 per cent less carbon dioxide emissions in 1994 than they did in 1990, a reduction of 1,350 kilo tonnes.

November: 178 companies, accounting for more than 65 per cent of industrial energy consumption, commit to become Industrial Energy Innovators and to be registered as such in the VCR.

Industry, at the November 9th MACIEE meeting, (Minister's Advisory Council on Industrial Energy Efficiency) confirms its 1 per cent per year energy efficiency target to 2000 and its ability to achieve carbon dioxide emission stabilization at 1990 levels by 2000.

CIPEC sponsors its 2nd International Energy Efficiency Conference.

Canadian Industry Program for Energy Conservation

CIPEC

Created in 1975, when energy security and high energy prices were major concerns, CIPEC is a voluntary initiative of Canada's manufacturing and mining companies. It is supported by government, energy utilities and industry associations, and promotes and monitors energy efficiency throughout Canadian industry.

From 1975 to 1990, Canadian industrial companies voluntarily reduced energy consumption per unit of production by over 26.2 per cent, an average annual reduction of 1.6 per cent. This is equivalent to 30 million tonnes of carbon dioxide emissions avoided per year.

In 1992, CIPEC refocused in response to Canada signing the Rio Accord and its commitment to stabilize carbon dioxide emissions at 1990 levels by the year 2000.

Today, energy efficiency, global competitiveness and the need to contribute to stabilizing energy related carbon dioxide emissions are key motivating forces for industry's voluntary efforts to reduce its energy consumption per unit of production.

Through supporting associations, 3,000 companies are now involved in CIPEC energy efficiency activities, up from 700 during the 1975 to 1990 period. CIPEC is a single, major voice for Canadian industry on energy efficiency.

In 1994, industry contributed well over $1.5 million in time and effort determining industry sector targets, reporting on their energy efficiency performance and encouraging other companies to become engaged. This is in addition to the millions of dollars industry invested in energy efficiency improvements.

CIPEC is governed by an 18 member Policy Board, most members of which also advise the Minister of Natural Resources Canada through participation in the Minister's Advisory Council on Industrial Energy Efficiency (MACIEE).

Industry's voluntary energy efficiency initiatives are coordinated by a 21 member Task Force Council. CIPEC's Policy Board and Task Force Council are supported by a small Secretariat.

CIPEC's Mission

> To promote effective voluntary action which enhances industrial energy efficiency and economic performance while participating in meeting Canada's carbon dioxide stabilization objectives.

Canadian Industry Program for Energy Conservation

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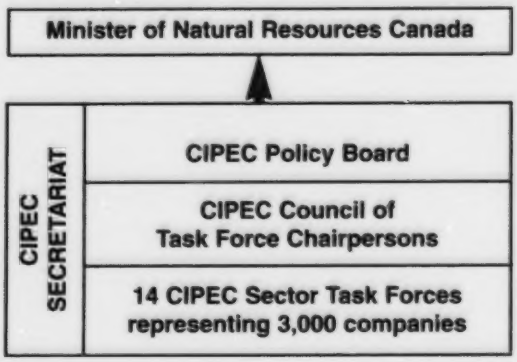
CIPEC Structure

Figure 1 illustrates CIPEC's organizational structure.

Figure 1


Minister of Natural Resources Canada
CIPEC SECRETARIAT
CIPEC Policy Board
CIPEC Council of Task Force Chairpersons
14 CIPEC Sector Task Forces representing 3,000 companies

CIPEC Policy Board

CIPEC's governing body is its Policy Board with representation from 18 industrial sectors. The Board sets CIPEC's overall policy direction which is carried out by the sector Task Forces, Council of Task Force Chairpersons and the CIPEC Secretariat. It monitors progress and accomplishments and meets about four times a year.

The Minister of Natural Resources Canada draws extensively from the CIPEC Policy Board for the membership of the Minister's Advisory Council on Industrial Energy Efficiency (MACIEE).

Policy Board Membership

CIPEC's Policy Board includes:

Chairman:

Chuck Hantho, *Dominion Textile Inc. and Dofasco Inc.*

Members:

Claude Chamberland, *Alcan Aluminum Limited*

Bob Renaud, *Chrysler Canada*

Peter Rankine, *Honeywell Limited*

Emmie Leung, *International Paper Industries Ltd.*

Ron Morrison, *Kodak Canada Inc.*

Frank Pickard, *Falconbridge Ltd.*

John D. Redfern, *Lafarge Canada Ltd.*

Stephen Van Houten, *Canadian Manufacturers' Association*

Peter Torbet, *Chairman, CIPEC Task Force Council*

Arthur Sawchuk, *Dupont Canada Inc.*

Robert Schad, *Husky Injection Molding Systems Ltd.*

Brenda Schiedel, *Coyle & Greer Awards Canada*

Fred Telmer, *Stelco Inc.*

Ron Munkley, *Consumers' Gas Company*

George Weyerhaeuser, Jr., *Weyerhaeuser Canada Ltd.*

Charles Wilson, *Shell Canada Ltd.*

Michael O'Brien, *Sunoco Group, Suncor Inc.*

Bent Larsen, *Executive Director, CIPEC*

Canadian Industry Program for Energy Conservation

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CIPEC Sector Task Force Council

Since 1975, major industrial sectors have been represented on the CIPEC Council. This Council is composed of the Chairperson of each Sector Task Force and meets 6 to 8 times a year. There are now 14 Sector Task Forces.

Between Council meetings, Sector Task Forces meet to set sector energy efficiency targets, review progress and to identify the energy efficiency needs particular to their sector.

The interests of approximately 3,000 companies are represented on the CIPEC Sector Task Force Council. In addition, there is a sharing of views with the natural gas and electric utilities and government through representatives from these sectors participating in the Council's activities as associate members.

Task Force Council Membership

Chairman:
Peter Torbet, *3M Canada*

Executive Director:
Bent Larsen

Sectors and Members:

Aluminum
Christien Van Houtte, *Aluminum Industry Association*

Brewery
Ralph Backman, *Labatt Breweries of Canada*

Electrical and Electronic
Steve Horvath, *Honeywell Ltd.*

Food Processing
John Corey, *McCain Foods Limited*

Steel
Susan Olynyk, *Dofasco Inc.*

General Manufacturing
Peter Notzl, *Canadian Manufacturers' Association*

Cement
John M. Lind, *St. Mary's Cement Company*

Mining
John Owen, *Falconbridge Limited*

Petroleum Refining
Bob Clapp, *Canadian Petroleum Products Institute*

Plastics
Don Clarke, *Canadian Plastics Institute*

Pulp and Paper
Norman Pridham, *Quono Corporation*

Textiles
Peter Chantraine, *Dupont Canada Inc.*

Transportation
Ken Rossi, *Ford Motor Company of Canada*

Wood Products
Dick Bryan, *Council of Forest Industries*

Collaborators:

Chemical
Bruce Caswell,
Canadian Chemical Producers Association

Government
Linda Ploeger,
Ontario Ministry of Environment and Energy
Richard McKenzie, *Natural Resources Canada*

Utilities
William Hale, *Ontario Hydro, (Canadian Electricity Association)*
Michael Stedman, *Centra Gas (Canadian Gas Association)*

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Energy Efficiency Performance: 1990 to 1994

Recording Industry's Progress

Industry's energy efficiency and carbon dioxide emission reduction progress is recorded in five main ways:

- through StatsCan surveys which collect energy consumption data from industrial companies.

  This data is used:

  - by Simon Fraser University's Canadian Industrial Energy End-Use Data and Analysis Centre (CIEEDAC) to analyze and compare year to year industrial energy consumption data, and from which are developed energy efficiency and energy intensity data
  - by CIPEC, its Sector Task Forces and associated trade associations, to build the industrial energy use data base and to monitor progress in relation to established targets
  - by Environment Canada to build the National Inventory of Greenhouse Gas Emissions

- by the Climate Change Voluntary Challenge and Registry (VCR) when it records individual company action plans. See Appendix 4.

Energy Use Data Collection and Analysis

CIPEC, over the past four years, has worked with industry associations, StatsCan, Natural Resources Canada (NRCan), and CIEEDAC to build the database and monitor industrial energy use since the 1990 base year. This has resulted in a mutually agreed upon data collection and analysis procedure.

StatsCan has historically recorded the consumption of energy from two separate sources. These are:

- Industrial Consumption of Energy (ICE) survey, which contributes information published in the Quarterly Report of Energy Supply and Demand (QRESD), and

- Consumption of Purchased Fuels and Electricity (CPFE) report, which forms part of the Annual Survey of Manufacturers (ASM).

Both reports have characteristics which make neither suitable as a monitoring device for energy consumption in specific industries.

To increase the quality, timeliness, reliability and suitability of the data reflecting energy consumption in specific industries, changes were made in 1994 to StatsCan's ICE survey. Appendix 3 illustrates the kind of information now requested by this survey. Information obtained by the new ICE survey has led to some changes in historical calculations.

Approximately 730 establishments, representing over 78 per cent of total industrial energy consumption, now report to StatsCan on their energy use. This information is also used to calculate the amount of carbon dioxide emissions which industry produces from stationary sources.

Recording Industry's Progress

Data for the 1995 ICE Survey will be collected from almost 2,000 companies, resulting in a significant increase in the scope of the survey, involving many more industry sectors and the ability to produce provincial or regional data. In addition, the survey is being customized for the steel and petroleum refining sectors to provide additional data on non-purchased fuel. The pulp and paper sector will use the generic ICE survey form but with modified guidelines.

Carbon Dioxide Emissions Data Collection and Analysis

In that Canada has committed to stabilize greenhouse gases at 1990 levels by the year 2000, it is critical that broad agreement be reached on:

- the definition of industry
- the total and type of energy consumed by Canadian industry, by sector
- the reporting system to track the amount of energy used in each year, by industrial sector and by each region of the country
- the factors used to convert each type of energy into the amount of carbon dioxide released
- the economic and other assumptions used to forecast industrial energy use, and
- the reporting system used to track the release by industry of greenhouse gases other than carbon dioxide.

Unfortunately, an accurate carbon dioxide and other greenhouse gas baseline data system is not yet available. Neither is there agreement on the assumptions for forecasting future industrial energy use.

Environment Canada is responsible for calculating the associated carbon dioxide and other energy related greenhouse gas emission estimates for the CIPEC defined universe as a subset of the total national greenhouse gas emissions inventory.

StatsCan and Environment Canada have signed a Memorandum of Understanding on Data Sharing, providing Environment Canada with full access to all energy data now gathered by StatsCan starting in calendar year 1996 and beyond, thus enabling further disaggregation of emissions.

Energy Efficiency

Energy efficiency is measured in a variety of ways. One widely used measure for international comparison purposes is energy use per capita. Another is energy use as a ratio of Gross Domestic Product (GDP). Neither, unfortunately reflects CIPEC's focus - improving the effectiveness / efficiency of energy use. Both international comparisons have serious flaws, including not accounting for the export of energy intensive products and related carbon dioxide emissions.

An alternative and more appropriate measure is the amount of energy needed to produce a unit of production. CIPEC primarily uses this measure to track the progress of Canadian industry.

CIPEC takes the position that, given the high energy efficiency of many of Canada's industrial sectors, less greenhouse gas emissions will result worldwide from more production in Canada than in other less energy efficient countries.

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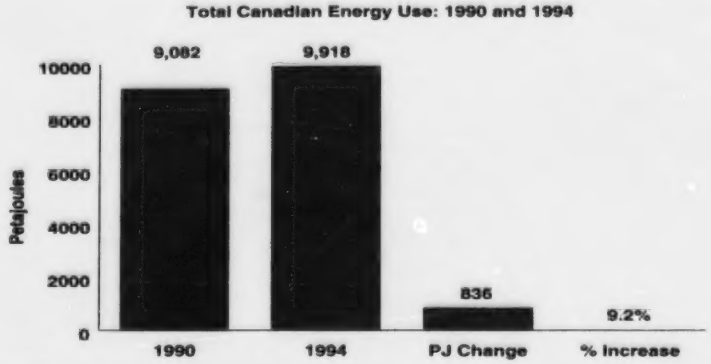
Energy Efficiency Performance: 1990 to 1994

Total Canadian Energy Consumption

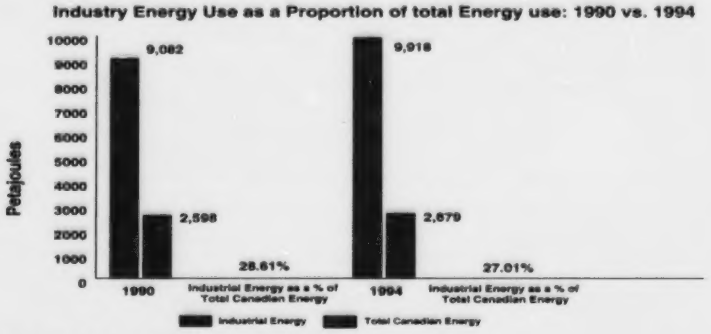
Canada consumes over 9,000 petajoules of energy each year. Between 1990 and 1994, its energy consumption increased by 9.2 per cent, or 836 petajoules, from 9,082 to 9,918 petajoules.

Figure 2



In 1994, industry consumed 27 per cent of total Canadian energy use, down from 28.6 per cent in 1990.

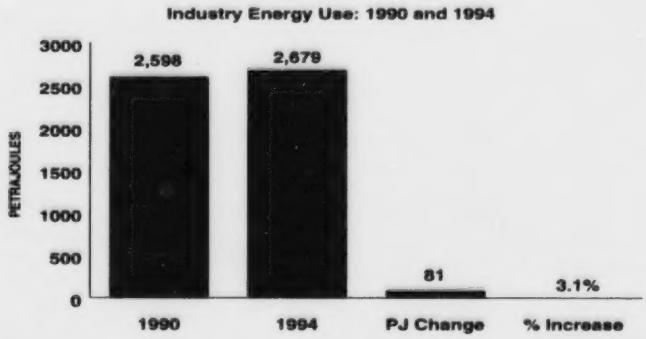
Figure 3



CIPEC Universe of Companies

The CIPEC universe of companies includes most of StatsCan's definition of the manufacturing and mining companies. See Appendix 1 for a list of the SIC codes for those sectors covered. Between 1990 and 1994, these companies increased their energy consumption by 81,000 terajoules, or 3.1 per cent.

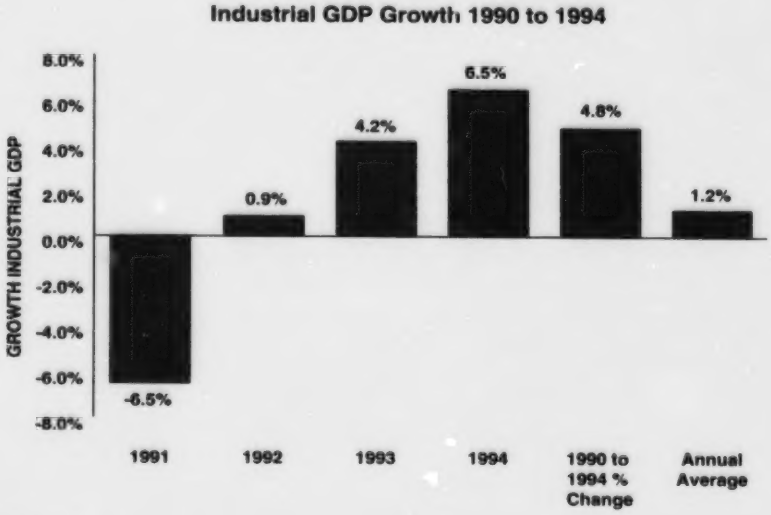
Figure 4



Economic Growth

Industrial output was erratic from 1990 to 1994, from minus 6.5 per cent in 1991 to positive growth of 6.5 per cent in 1994. Overall, however, only a 1.2 per cent average annual growth rate was achieved by Canadian industry during this period.

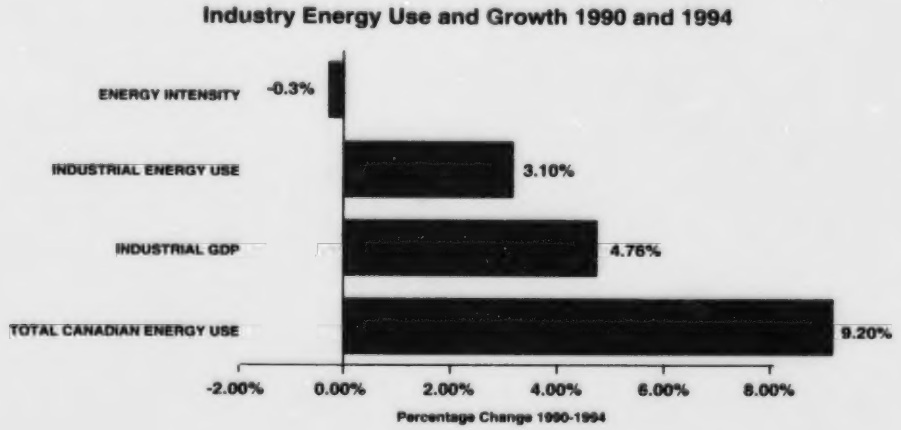
Figure 5



Source: StatsCan SO4 & MO4

From 1990 to 1994, while total Canadian energy use rose by 9.2 per cent and industrial output rose by 4.8 per cent, industrial energy use rose only 3.1 per cent. As a result, industrial energy intensity (industrial energy use divided by industrial GDP) improved slightly by 0.3 per cent.

Figure 6



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Energy Efficiency By Sector: 1990 to 1994

For purposes of this annual report, industry is grouped into four categories: Tier 1 "Base"; Tier 1 "New Reporting", Tier 2 sectors and all other sectors on which energy use data is collected but on an aggregated basis. See also Appendix 1.

Figure 7

Tier 1 "Base" Sectors 69.7 % of Total Industrial Energy Use	Tier 1 "New Reporting"Sectors 9.1 % of Total Industrial Energy Use	Tier 2 Sectors	All Other Industrial Sectors
		21.2 % of Total Industrial Energy Use	
Cement Chemicals Metal Mining Petroleum Refining Pulp & Paper Smelting and Refining Steel	Glass Non Metal Mining Oil Sands/Upgraders	Breweries Chemical Fertilizers Electrical and Electronics Food Industry • Bakery • Dairy • Fruit and Vegetables • Meat and Poultry Foundries General Manufacturing • Clothing • Furniture • Leather/Allied • Machinery • Metal Fabrication • Printing/Publishing • Tobacco • All other Lime Plastics Rubber Textiles Transportation Wood Products	See Appendix 1 on Page 71

Tier 1 sectors contain companies that are large users of energy, while Tier 2 companies use more modest amounts of energy.

Tier 1 "Base" Sectors are those for which energy consumption data has been collected since 1990. Tier 1 "New Reporting" sectors are those for which data was first collected in 1994.

No data was collected in the 1994 ICE Survey on Tier 2 companies. In 1995, the ICE Survey will be sent to almost 2,000 companies which will enable data to be collected for most Tier 2 sectors.

Energy Efficiency By Sector: 1990 to 1994

Figure 8 lists in descending order the amount of energy consumed by sectors in 1990 and 1994.

Figure 8

Industrial Energy Use by Sector: 1990 and 1994

Tier 1 "Base"	1990 Terajoules	% of Total	1994 Terajoules	% of Total	% Change
Pulp & Paper*	739,823	28.5%	847,135	31.6%	14.51%
Petroleum Products Refining**	303,666	11.7%	273,303	10.2%	-10.00%
Steel	219,305	8.4%	236,937	8.8%	8.04%
Smelting and Refining	195,831	7.5%	221,217	8.3%	12.96%
Chemicals***	159,598	6.1%	170,710	6.4%	6.96%
Metal Mining	99,256	3.8%	69,507	2.6%	-29.97%
Cement**	52,575	2.0%	47,659	1.8%	-9.35%
Sub Total	**1,770,054**	**68.1%**	**1,866,468**	**69.7%**	**1.6%**
Tier 1 "New Reporting"	**Terajoules**	**% of Total**	**Terajoules**	**% of Total**	
Oil Sands/Upgrader	145,932	5.6%	189,350	7.1%	29.75%
Non Metal mining	38,740	1.5%	39,679	1.5%	2.42%
Glass	12,105	0.5%	14,103	0.5%	16.51%
Sub Total	**196,777**	7.6%	**243,132**	9.1%	**1.5%**
Total All Tier 1	**1,966,831**	**75.7%**	**2,109,600**	**78.8%**	**3.1%**
All Other Sectors including Tier 2	**631,534**	**24.3%**	**569,188**	**21.2%**	**-3.1%**
All Industry	**2,598,365**		**2,678,788**		**3.1%**

Source: Statistics Canada, NRCan and CIPEC Task Forces

* In 1994, only 26 per cent of the energy used in the pulp and paper sector was based on fossil fuel. The rest was mainly biomass and hydro electric power.

** The petroleum refining and cement sectors have revised the data the industry provided to Statistics Canada in 1990 as explained in greater detail in their sections of this report.

*** Historic and forecast energy use data shown in this report for the chemical sector are based on Statistics Canada's ICE survey as for other CIPEC sectors. The Canadian Chemical Producers' Association (CCPA) annual Reducing Emissions report covers emissions and projections for all greenhouse gases for all its members. The CCPA methodology does not correspond directly with the energy use data reported by StatsCan.

Energy Efficiency by Sector - Tier 1 "Base"

Tier 1 "Base" Sectors

Seven sectors - pulp and paper, petroleum refining (petroleum products), smelting and refining, steel, chemicals, metal mining and cement consumed just over 69 per cent of all the energy used by industry in 1994. Between 1990 and 1994, energy consumption in these sectors increased by 1.6 per cent . See Figure 9.

Figure 9

Tier 1 "Base" Sectors: 1990 and 1994

Tier 1 "Base"	1990 Terajoules	% of Total	1994 Terajoules	% of Total	% Change
Pulp & Paper*	739,823	28.5%	847,135	31.6%	14.51%
Petroleum Products Refining**	303,666	11.7%	273,303	10.2%	-10.00%
Steel	219,305	8.4%	236,937	8.8%	8.04%
Smelting and Refining	195,831	7.5%	221,217	8.3%	12.96%
Chemicals***	159,598	6.1%	170,710	6.4%	6.96%
Metal Mining	99,256	3.8%	69,507	2.6%	-29.97%
Cement**	52,575	2.0%	47,659	1.8%	-9.35%
Sub Total	**1,770,054**	**68.1%**	**1,866,468**	**69.7%**	**1.6%**

Source: Statistics Canada, NRCan and CIPEC Task Forces

* In 1994, only 26 per cent of the energy used in the pulp and paper sector was based on fossil fuel. The rest was mainly biomass and hydro electric power.

** The petroleum refining and cement sectors have revised the data the industry provided to Statistics Canada in 1990 as explained in greater detail in their sections of this report.

*** Historic and forecast energy use data shown in this report for the chemical sector are based on Statistics Canada's ICE survey as for other CIPEC sectors. The Canadian Chemical Producers' Association (CCPA) annual Reducing Emissions report covers emissions and projections for all greenhouse gases for all its members. The CCPA methodology does not correspond directly with the energy use data reported by StatsCan

Four sectors - smelting and refining, pulp and paper, chemical products and Steel - increased the amount of energy consumed between 1990 and 1994. Three sectors - cement, petroleum products refining, and metal mining - reduced the amount of energy they consumed.

Each Tier 1 "Base" status report presented below has been approved by its Sector Task Force and the related trade association.

For the most part, each sector report identifies for the years 1990, 1991, 1992, 1993 and 1994:

- the amount of energy used in Terajoules,
- the units of output for each sector,
- the energy efficiency rate (energy use divided by units of output), and
- the sector's energy efficiency index (a comparison based on 1990 equaling 100).

CIPEC

Energy Efficiency by Sector - Tier 1 "Base"

The objective is to show the energy efficiency or energy intensity performance of each sector from 1990 through 1994 and to identify the annual energy reduction commitment of each sector from 1995 to 2000.

Energy Efficiency Performance

All seven Tier 1 "Base" sectors demonstrated increased energy efficiency (EE) between 1990 and 1994, as illustrated in Figure 10.

Figure 10

Industrial Sectors	Increase (Decrease) in Energy Efficiency	Increase (Decrease) in Energy Intensity*
Tier 1 "Base"		
Pulp & Paper (Fossil fuel)	19.20%	
Petroleum Refining	9.23%	
Steel	16.6%**	
Smelting and Refining		6.23%
Chemicals		0.22%***
Cement	8.5%	
Metal Mining	12.0%	
Tier 1 "New Reporting"		
Oil Sands/Upgrader	13.21%	
Non Metal mining		2.67%
Glass	(4.9%)	

Source: StatsCan and Sector Task Forces

* Energy efficiency is the energy use divided by industrial production. Energy intensity is measured by a sector's energy use divided by the sector's GDP. A ( ) sign = less energy efficient / less energy intensive.

** Based on an adjusted energy rate for 1990

*** Historic and forecast energy use data shown in this report for the chemical sector are based on Statistics Canada's ICE survey as for other CIPEC sectors. The Canadian Chemical Producers' Association (CCPA) annual Reducing Emissions report covers emissions and projections for all greenhouse gases for all its members. The CCPA methodology does not correspond directly with the energy use data reported by StatsCan.

Forms of Energy Used and Trends

CIPEC Annual Reports up to 1990 included information by sector on the type of energy being used, for example, coal, petroleum products, natural gas, electricity.

It is our hope that the ICE survey will enable us to provide this kind of information in next year's annual report.

Pulp and Paper

The pulp and paper industry consumed 31 per cent of Canada's total industrial energy in 1994.

Biomass energy (pulp liquor, waste wood, etc.), however, constituted over 53 per cent of the energy consumed by this sector in 1994. The pulp and paper industry used 22 per cent more biomass in 1994 than it did in 1990.

Electrical energy comprised 22 per cent of the sector's total energy requirements, most of which is derived from hydraulic sources. Only 26 per cent of this sector's energy use is based on fossil fuel.

Figure 11 compares the sector's total energy use, units of output, it's energy efficiency rate, and it's energy efficiency index from 1990 through 1994.

Figure 11

Pulp and Paper Energy Efficiency Including Biomass Energy

Measure	1990	1991	1992	1993	1994
Total Energy Use (Terajoules)	739,823	751,583	757,280	742,800	847,136
Production (Kilotonnes)	26,131	26,323	27,217	28,814	31,468
Energy / Production (GJ/T)	28.31	28.55	27.82	25.78	26.92
Energy / Production Indexed	1.000	1.008	0.983	0.911	0.951

Source: StatsCan, NRCan, CIEEDAC, Sector Task Force

During the period 1990 to 1994, pulp and paper production increased by 20 per cent, while total energy consumption per tonne declined by 5 per cent, despite an estimated 2 per cent electrical energy consumption increase attributed to the installation of environmental equipment. This reduction reflects improved energy efficiency.

Figure 12 shows the corresponding comparison based only on fossil fuel consumption.

Figure 12

Pulp and Paper Energy Efficiency - Fossil Fuel Only

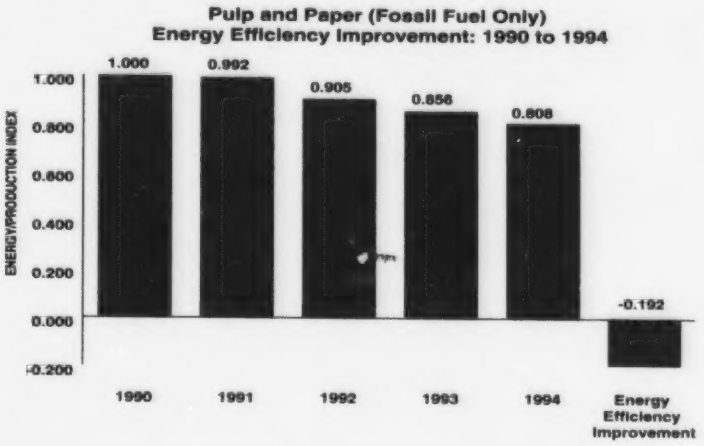
Measure	1990	1991	1992	1993	1994
Total Energy Use (Terajoules)	223,625	223,448	210,856	211,845	217,604
Production (Kilotonnes)	26,131	26,323	27,217	28,814	31,468
Energy / Production (GJ/T)	8.558	8.489	7.747	7.352	6.915
Energy / Production Indexed	1.000	0.992	0.905	0.859	0.808

Source: StatsCan, NRCan, CIEEDAC, Pulp and Paper Sector Task Force

From 1990 to 1994, fossil fuel consumption declined in absolute terms, while fossil fuel consumption per unit of production declined by 19 per cent, as a result of process improvements and fuel substitution. See Figure 13.

Pulp and Paper

Figure 13



The industry also instituted changes which enabled better utilization of forest resources, including investing in thermo-mechanical pulp technology to produce newsprint replacing groundwood technology, and replacing virgin fibre with recycled fibre.

The average recycled content of newsprint rose from 1.1 per cent in 1990 to almost 16 per cent in 1994, representing an increase of 1.35 million tonnes and reducing the pulp and paper industry's electricity consumption by over 2.5 million MWh per year.

The fibre recycling activities enabled residual fibre to be diverted from landfill sites, thereby eliminating the carbon dioxide and methane emissions that would have resulted from its decomposition.

The industry also cooperated with local electrical utilities in their energy saving programs. For example, Ontario Hydro sponsored programs saved the industry over 160,000 MWh/year of electrical power. This is equivalent to the power used by a city of 16,000 inhabitants. The reduction in carbon dioxide emissions from this one initiative alone is about 150,000 tonnes per year.

The off-site activities of the industry also contributed to the reduction of "greenhouse" gases. A land utilization program enabled residual materials, biosolids formerly considered to be waste, to be utilized as a resource. Biosolids are used by the agricultural community, in lieu of manure and chemical fertilizers, and by others for industrial site rehabilitation, reforestation and afforestation.

Pulp and Paper Energy Efficiency Commitment: 1995 - 2000

> The pulp and paper sector is committed to improving its energy efficiency by 1.0 per cent per unit of output per year for the period 1995 to 2000.

Pulp and Paper

Pulp and Paper Task Force

Norman Pridham, QUNO Corp., Chairman
Bob Eamer, Domtar Inc.
Dick Bryan, Council of Forest Industries
Robert Jobin, Kruger Inc.
A. J. Chmelauskas, MacMillan Bloedel Limited
Mike Kuriychuk, Avenor Inc.
Ray Norgen, Weyerhaeuser Canada Ltd.
H. I. Simonsen, Consultant, Canadian Pulp and Paper Association (CPPA)
George Weyerhaeuser, Jr. Weyerhaeuser, Canada Ltd.
Tim Whitford, Weldwood of Canada
Pierre Vézina, AIFQ
Jean-Pierre Martel, CPPA

Energy Efficiency Initiatives - Pulp and Paper

The following are examples of energy efficiency initiatives undertaken in the pulp and paper sector:

QUNO's Thorold mill conversion from a thermomechanical pulp process to the production of newsprint from recycled fibre (old newspapers and magazines) has resulted in electrical power savings of over 500,000 MWh/year. This is equivalent to the power consumed by a city of 50,000 people. "Old news is not only good news, but also good energy efficiency news".

The Thorold mill is the most energy efficient newsprint mill in Canada, consuming only 12.84 GJ/tonne of product.

By using old newspapers and magazines, QUNO consumes 250,000 tonnes/year of waste fibre which would have gone into landfill sites, creating carbon dioxide and methane emissions.

Since 1990, QUNO's Baie Comeau mill has reduced its overall energy use by 8 per cent and, more importantly, reduced its fossil fuel consumption by over 75 per cent. This has been achieved by the substitution of woodwaste and bark for fuel oil.

Petroleum (Products) Refining

The petroleum products subsector of petroleum refining is Canada's second largest industrial user of energy consuming 10 per cent of total industrial energy. It includes 23 refineries and a network of distribution channels, bulk plants and 17,000 retail outlets.

The two oil sands plants, located in northern Alberta, and one heavy oil upgrader in Saskatchewan, which are the other subsector of petroleum refining, are reported separately this year under the Tier 1 "New Reporting" category.

Petroleum (products) refining employs over 100,000 Canadians directly and another 250,000 indirectly.

Total energy use, units of output, the sector's energy efficiency rate, and the overall energy efficiency index for 1990 and 1994 are shown in Figure 14.

The petroleum products industry's energy use numbers for both 1990 and 1994 differ from those recorded by StatsCan. The revised data is based on an extensive re-examination of the data base to ensure a consistent and accurate reporting format. The industry revised data should now be considered the base numbers from which the sector will henceforth be measured.

Figure 14

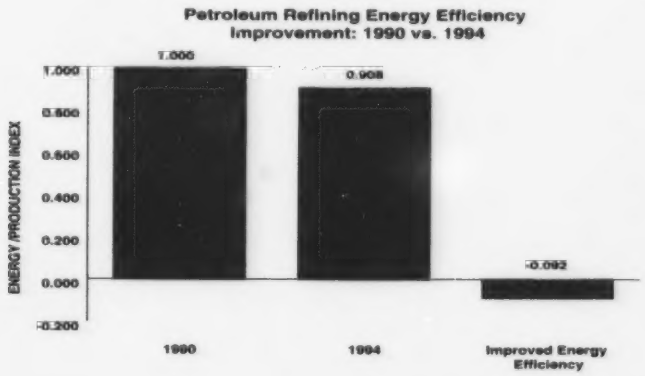
Petroleum Products Energy Efficiency: 1990 to 1994

Measure	1990		1994	
	StatsCan Data	Revised Industry Data	StatsCan Data	Revised IndustryData
Total Energy Use (Terajoules)	291,235	303,666	290,344	273,306
Production (Cubic metres)	75,873	75,873	75,229	75,229
Energy / Production (GJ/Cubic metres)	3.838	4.002	3.859	3.633
Energy / Production Indexed	1.000	1.000	1.005	0.908

Source: StatsCan, NRCan, CIEEDAC, Petroleum Refining Sector Task Force

In essence, the petroleum refining energy efficiency (energy use divided by output, measured in cubic metres) improved by 9.2 per cent between 1990 and 1994.

Figure 15



CIPEC

Energy Efficiency by Sector - Tier 1 "Base"

Petroleum (Products) Refining

Energy Efficiency Improvements: 1972 to 1990

From 1972 through 1990, the petroleum products sub-sector improved its energy efficiency by 32.5 per cent through a combination of capital investments, operating and technological improvements, and operating and maintenance personnel training.

Energy Efficiency Improvements: 1991 to 1994

When measured on a per unit of output basis, the petroleum products sub-sector has recorded a 9.2 per cent reduction in the amount of energy used to produce a thousand cubic metres of output, - going from 4.0 Gigajoules of energy in 1990 to 3.6 Gigajoules in 1994 (this calculation is based on higher heating values). This is confirmed by the internationally recognized Solomon Energy Efficiency Index which records an energy efficiency of almost 8.8 per cent for the period 1990 to 1994 (this calculation is based on lower heating values).

Since 1990, the sub-sector has gone through a major restructuring to improve its economic efficiency: six refineries have been shutdown; 5,000 to 6,000 retail service stations and a number of terminals and bulk plants have also closed.

The focus on energy efficiency has been increased application of advanced control and optimization technology, operating efficiency improvements and modest capital investments.

Petroleum Products Energy Efficiency Commitment: 1995 - 2000

> The petroleum products sector is committed to improving its energy efficiency by 1.0 per cent per unit of output per year for the period 1995 to 2000.
>
> This will be a significant challenge in tandem with improving the environmental performance of gasoline and diesel fuel. In addition, refiners will be dealing with ever changing crude feedstocks which can impact the energy intensity of operations.

The industry is confident that it will deliver on its commitment through further implementation of advanced process control, operating improvements, training and selected capital investments.

CIPEC

Energy Efficiency by Sector - Tier 1 "Base"

Petroleum Refining

Petroleum Refining Task Force

Peter Baltais, Imperial Oil Limited
Jack Burkholder, CIPEC, Secretariat Support
Bob Clapp, CPPI - National
Burt Lang, Suncor Inc., Oilsands Group
Bob LeFlar, Parkland Refining Ltd.
Pierre Moreau, Ultramar Canada Inc.
John Retallack, Novacor Chemicals (Canada)
Mike Stephen, Chevron Canada Limited
Kees Versfield, Syncrude Canada Ltd.
Doug Mah, Consumers Co-op Refiners Ltd.
Bruce Cater, Sunoco Group, Suncor Inc.
Richard Fry, CIPEC, Technical Support
Jim LeBlanc, Irving Oil Limited
Dave McAffee, Petro-Canada
John Nyboer, CIEEDAC, Simon Fraser University
Ron Schmitz, Husky Oil Operations
Nick Tremblay, Shell Canada Products Limited

Energy Efficiency Initiatives - Petroleum Refining

Over the past year, the following energy efficiency initiatives were taken by companies in the petroleum refining sector:

Power Recovery Turbine

As part of Ontario Hydro's Power Saving Study Program, a company invested $1.4 million to install a power recovery turbine on a process unit. The facilities recovered energy lost in the process and transformed it into 700 kilowatts of electrical energy. The impact of this was to reduce carbon dioxide emissions by 4,600 Tonnes a year.

Operating Improvements

A series of operational improvements have been initiated by the industry, including:

- improving efficiency of heaters and boilers
- optimizing refinery steam systems
- steam trap upgrade and repair programs
- use of variable speed motors
- low level heat programs
- pump upgrade programs

Office Building Management

One company reduced office building energy consumption by 15 per cent since 1990 through the following initiatives:

- use of light sensors in low traffic areas
- reduce lighting levels
- low energy lighting
- building generators to reduce peak loads
- shutdown of equipment during non-peak hours.

Energy Efficiency by Sector - Tier 1 "Base"

Steel

The steel sector is Canada's third largest industrial user of energy, consuming 9 per cent of Canada's total industrial energy in 1994.

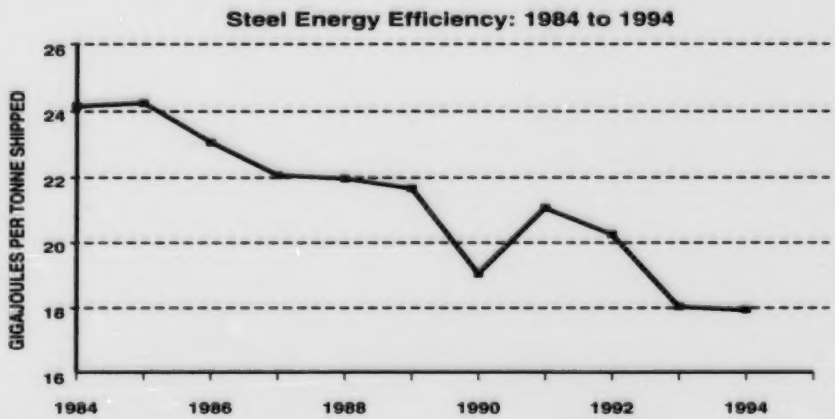
Companies participating in CIPEC are members of the Canadian Steel Environmental Association (CSEA), part of the Canadian Steel Producers Association (CSPA). CSEA represents 93 per cent of the production capacity of the Canadian steel industry and includes Algoma, Co-Steel Lasco, Courtice, Dofasco, IPSCO, Ivaco, Manitoba Rolling Mills, Sammi Atlas (Specialty), Sidbec-Dosco (ISPAT), Slater and Stelco.

In 1994, the Canadian steel industry produced 13.8 million tonnes of steel and shipped 13.4 million tonnes. Products range from primary products such as rails, structural shapes, bars and rods, to hot rolled strip and plate, to highly finished cold rolled sheets and coated materials.

Markets served are broad and varied, including automotive vehicles and parts, appliances, packaging, construction, wire and wire products, pipe and tube and the steel service centre wholesale market.

Figure 16 traces the significant decline in Gigajoules of energy consumed per tonne of steel shipped from 1984 to 1994.

Figure 16



Source: Energy: StatsCan QRESD SIC 2910
Shipments: StatsCan Cat #41-001

Improvement in the sector's energy efficiency can be traced to a number of factors, including:

- raw material changes, such as increased use of:
  - higher concentrations of iron in the pelletizing ores used by blast furnaces,
  - recycled steel scrap;

Steel

- process changes such as:
  - increased use of electric arc furnace melting
  - close coupling of continuous casting with hot rolling, or pickling with cold rolling
  - investment in equipment like continuous casting machines to improve product yields
  - increased use of high efficiency equipment such as advanced motors and lights.

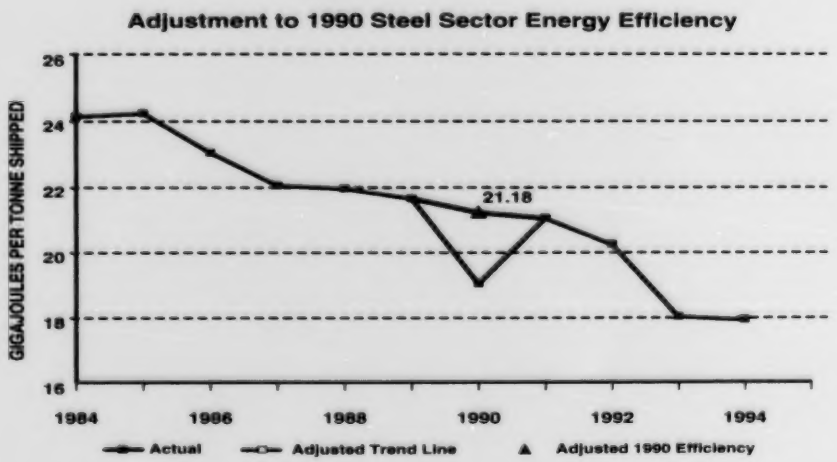
Adjustment to the 1990 Energy Efficiency Rate

In 1990, prolonged labour disruptions - four to five months - at two large steel companies caused an unusual decrease in the energy rate that year.

Steel production at these companies is based on the iron ore- blast furnace-oxygen steelmaking route. With their shut-down, the proportion of electric furnace-scrap remelting steelmaking increased significantly in Canada. The consequence was an unusually low energy rate.

The actual energy 1990 use, as shown in Figure 16, is 10.4 per cent less than the 21.18 GJ/tonne shipped that would have appeared in a normal year. This adjustment is indicated in Figure 17.

Figure 17



Source: Energy: StatsCan QRESD SIC 2910
Shipments: StatsCan Cat #41-001
Steel Sector Task Force

CIPEC

Energy Efficiency by Sector - Tier 1 "Base"

Steel

Energy Efficiency Performance

Figure 18 compares total energy use, units of output, the sector's energy efficiency rate, and the overall energy efficiency index from 1990 through 1994.

Figure 18

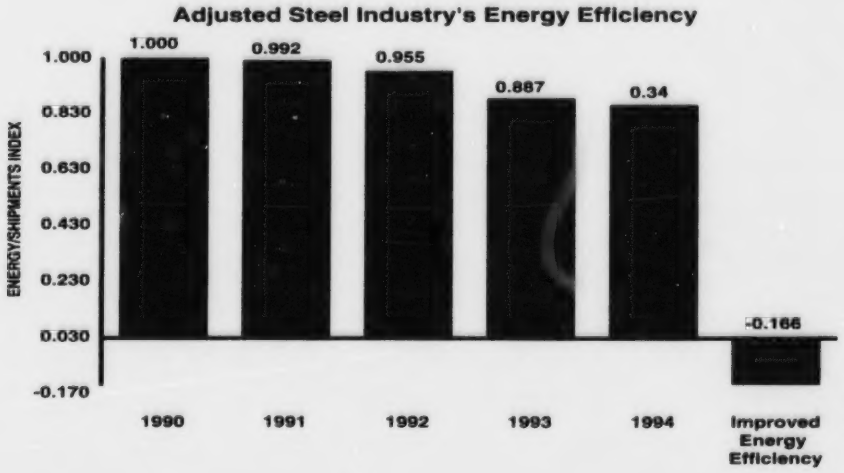
Steel Industry's Energy Efficiency : 1990 to 1994

Adjusted 1990	1990	1990 Adjusted	1991	1992	1993	1994
Total Energy Use (Terajoules)	219,305	no change	236,142	246,970	241,546	236,937
Shipments (tonnes)	11,563,101	no change	11,241,164	12,207,144	13,312,911	13,406,027
Energy / Shipments (GJ/tonnes)	18.97	21.18	21.01	20.23	18.14	17.67
Energy / Shipments Indexed		1.000	0.992	0.955	0.857	0.834

Source: StatsCan, NRCan, CIEEDAC, Steel Sector Task Force

Figure 19 illustrates that the sector's adjusted energy efficiency (energy use divided by shipments, measured in kilo tonnes) improved by 16.6 per cent over the period 1990 to 1994.

Figure 19



Energy Efficiency Commitment:

The steel sector is committed to improving its energy efficiency by 1.0 per cent per unit of output per year averaged over the period 1990 to 2000 based on the adjusted base year rate of 21.18 GJ / tonne shipped.

CIPEC

Energy Efficiency by Sector - Tier 1 "Base"

Steel

Steel Task Force

Susan Olynyk, Dofasco Inc., Chair Al Schuldt, Stelco Ltd.

Energy Efficiency Initiatives - Steel

Over the past year, the following were among the energy efficiency initiatives undertaken by companies in the steel sector:

Co-Steel Lasco

At the electric arc steelmaking vessel, a submerged arc practice was adopted. In concert with a foamy slag operation, the submerged arc allows the arc size to be optimized and thereby saves electricity.

Dofasco

At the #3 Coke Plant, measurement of final coke temperature and the use of control charts helped to improve coke oven battery heating, improve resulting coke quality and hence achieve energy savings at the blast furnaces.

Slater

Installation of a billet extractor rolling mill reheat furnace provided a reduction in natural gas and electricity consumption for Rolling Operations as a result of improved mill efficiency.

Stelco

Improvements to the skid system insulation in the Hot Strip Mill at Lake Eire Works reduced natural gas consumption by 480 Terajoules a year, a decrease in furnace fuel consumption of 27 per cent.

Upcoming Activities

At Dofasco, the startup in late 1996 of an electric arc/continuous casting facility to replace BOF steelmaking/ingot casting facilities shutdown in 1993 will reduce specific energy consumption 10 to 20 per cent.

At Slater Steel, improvements to the utilization of oxygen in the Oxygen/Carbon lance on the arc furnace will provide expected electricity reductions of 7 KwH/ton in its steelmaking operations.

At Stelco's Hilton Works, the use of pulverized coal injection at the blast furnaces and associated reductions in the amount of coke produced will increase overall plant efficiency.

Non Ferrous - Smelting and Refining

The non ferrous smelting and refining sector is Canada's fourth largest industrial user of energy, consuming 8 per cent of Canada's total industrial energy. It includes primary aluminum production and primary smelting and refining of non ferrous metals.

Figure 20 compares total energy use, units of output, the sector's energy efficiency rate, and the overall energy efficiency index from 1990 through 1994.

Figure 20

Non Ferrous Smelting and Refining's Energy Intensity: 1990 to 1994

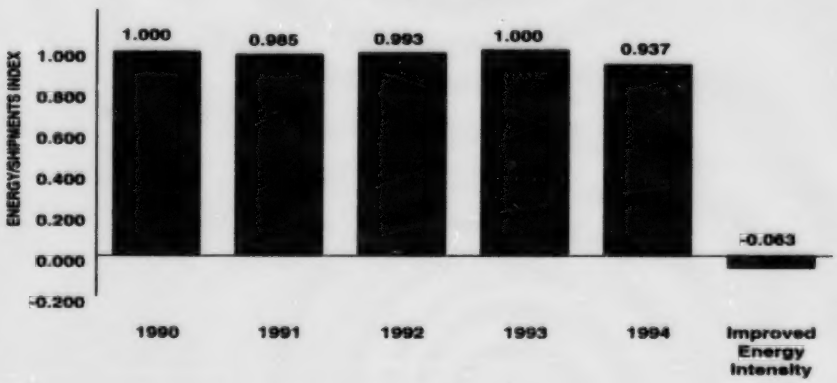
Measure	1990	1991	1992	1993	1994
Total Energy Use (Terajoules)	195,831	209,624	220,751	243,518	221,217
Gross Output (Millions of constant '86$)	8,146	8,849	9,247	10,060	9,818
Energy / Production (MJ/$)	24.040	23.689	23.873	24.207	22.532
Energy / Production Indexed	1.000	0.985	0.993	1.007	0.937

Source: StatsCan, NRCan, CIEEDAC, Non-Ferrous Smelting and Refining Sector Task Force

The smelting and refining sector's energy intensity (energy use divided by output, constant 1986 dollars) improved by 6.3 per cent between 1990 and 1994.

Figure 21

Non Ferrous Smelting and Refining's Energy Intensity: 1990 to 1994



Primary Aluminum Production

Aluminum production comprised almost 72 per cent of the energy used by the smelting and refining sector in 1994.

Electric power represents almost 30 per cent of aluminum production costs. The increase in the price of a KwH of electricity and the large volume of electricity required to produce aluminum were strong incentives for developing technologies capable of greater energy efficiency.

CIPEC

Energy Efficiency by Sector - Tier 1 "Base"

Non Ferrous - Smelting and Refining

Energy Efficiency Commitment: 1995 - 2000

The aluminum and non-ferrous sector is committed to improving its energy efficiency by 1.0 per cent per unit of output per year for the period 1995 to 2000.

Non Ferrous Smelting and Refining Task Force

John Owen, Falconbridge Limited
Peter McBride, Ontario Mining Association
Keith Eldridge, Iron Ore Company
Rick Green, Noranda
John Lemay, INCO Ontario Division
Milt Goble, INCO Manitoba Division
Anthony Howard, Echo Bay
Kees Versfeld, Syncrude
Gerry Villianotos, Falconbridge
Henry Smith, Williams Operating
John McDonald, Placer
Christian Van Houtte, Aluminum Industry Association

Energy Efficiency Initiatives - Non Ferrous Smelting and Refining

Aluminum

Since 1940, the average quantity of energy required to produce one kilogram of aluminum has been cut in half, from 27 KW/h to 13.5 KW/h. Nearly 80 per cent of the aluminum produced in Canada comes from smelters using state of the art technologies. Therefore, even with a considerable increase in the overall Canadian production since the beginning of the 1990's, the total demand for energy has declined.

Better work practices:

To be efficient, the best technologies must be coupled with work practices favouring energy savings. The fine tuning of equipment and the rational use of all energy sources–electricity, natural gas, fuel–contribute to a cost reduction, an improvement in the quality of the environment and to greater production performance.

Recycling:

The recycling of aluminum saves 95 per cent of the energy needed to produce new metal from raw materials. In Canada, enough electricity is saved this way to supply the total energy needs of 15,000 households for an entire year. It is expected that by the year 2000, recycled aluminum will account for 40 per cent of the world aluminum consumption. Aluminum can be recycled almost indefinitely without losing its properties.

Non Ferrous - Smelting and Refining

Energy Efficiency Initiatives - Non Ferrous Smelting and Refining

Utilization:

Whatever its use, aluminum contributes to energy savings. Cans are lighter than steel or glass and are easier and cheaper to transport; they are 100 per cent recyclable. Planes, railroad cars, trailers, buses are all built with aluminum and the weight reduction generates substantial energy savings.

Noranda Metallurgy - CCR Refinery

Noranda's CCR refinery initiated an energy efficiency program in 1990. Now in its fifth year, the program is achieving annual energy savings of 24 per cent or $2.5 million versus 1990. Carbon dioxide emissions have been reduced by 25,000 tonnes a year.

Hudson Bay Mining and Smelting

Installation of new technology completed in 1993 is resulting in energy savings of 800 terajoules per year. Carbon dioxide emissions are 50 per cent or 170,000 tonnes lower. Further energy efficiency measures are expected to produce savings of $1 million per year.

Energy Efficiency by Sector - Tier 1 "Base"

Chemical Products

The chemical products sector is Canada's fifth largest industrial user of energy, consuming 6 per cent of total industrial energy in 1994. The sector includes industrial chemicals (SIC 371) and plastics and resins (SIC 3731).

Figure 22 compares total energy use, units of output, the sector's energy efficiency rate, and the overall energy efficiency index from 1990 through 1994.

Figure 22

Chemical Products Energy Intensity: 1990 to 1994*

Measure	1990	1991	1992	1993	1994
Total Energy Use (Terajoules)	175,701	184,625	164,988	157,156	196,544
Production (Millions '86$)	10,056	11,071	11,056	11,070	11,274
Energy / Production (MJ/86$)	17.472	16.676	14.923	14.197	17.443
Energy / Production Indexed	1.000	0.954	0.854	0.813	0.998

Source: StatsCan, NRCan, CIEEDAC.

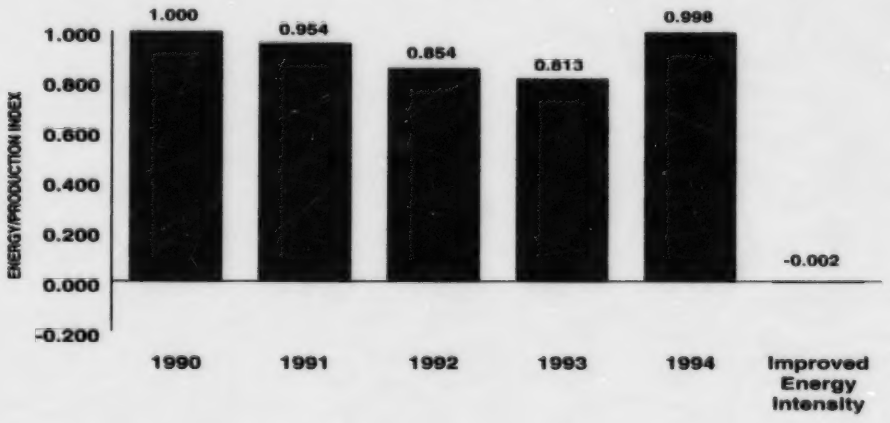
* Historic and forecast energy use data shown in this report for the chemical sector are based on Statistics Canada's ICE survey as for other CIPEC sectors. The Canadian Chemical Producers' Association (CCPA) annual Reducing Emissions report covers emissions and projections for all greenhouse gases for all its members. The CCPA methodology does not correspond directly with the energy use data reported by StatsCan.

The chemical products sector's energy intensity improved by 0.20 per cent between 1990 and 1994.

(The energy/production index is determined by dividing energy use by output. For the chemical industry, the output currently being used is a surrogate measured in constant 1986 dollars and is preliminary to identifying an industry unit of output.)

Figure 23

Chemical Products Energy Intensity: 1990 to 1994



Metal Mining

The metal mining sector is Canada's sixth largest industrial user of energy, consuming 2.6 per cent of Canada's total industrial energy.

Because transportation is an integral part of this industry, diesel and other transportation fuels are included in this sector's energy use data.

The Canadian mining industry directly employs 335,000 people and indirectly creates jobs for another 258,000. It is the mainstay of 150 communities.

In 1994, the industry generated $20 billion in income in Canada, provided almost 15 per cent of Canada's total exports and contributed $9.9 billion to the mineral trade balance.

Canada is a world leader in high-tech mining. The industry invests more than $100 million annually in research and development; 85 per cent of the workforce uses advanced technology.

Because mining is, by nature, highly energy intensive, energy management is the way of doing business - not a "flavour of the month". Reflecting this philosophy, in the period 1990 to 1994, the industry's energy efficiency improved by 13 per cent.

Figure 24 compares total energy use, units of output, the sector's energy efficiency rate, and its overall energy efficiency index.

Figure 24

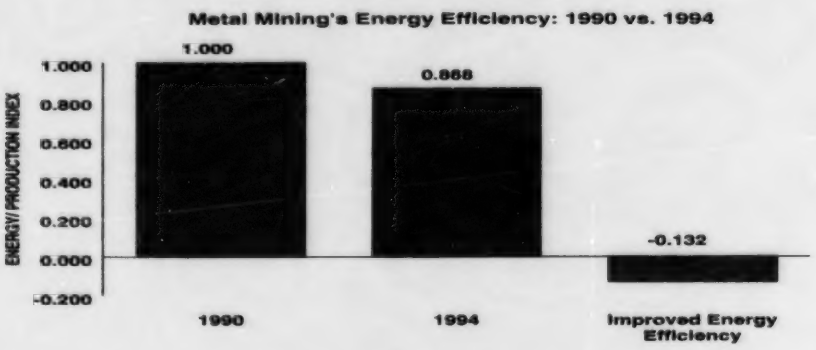
Metal Mining's Energy Efficiency: 1990 to 1994

Measure	1990	1994
Total Energy Use (Terajoules)	99,256	69,509
Production (Kilotonnes)	2,610,720	2,077,133
Energy / Production (GJ/T)	0.038	0.033
Energy / Production Indexed	1.000	0.868

Source: StatsCan, NRCan, CIEEDAC, Metal Mining Sector Task Force

The mining and metallurgy sector's energy efficiency (energy use divided by output, measured in kilotonnes) improved by 13.2 per cent between 1990 and 1994.

Figure 25



CIPEC

Energy Efficiency by Sector - Tier 1 "Base"

Metal Mining

The mining industry has the three most energy efficient zinc plants in the world, the most energy efficient nickel producer and the lowest cost nickel producer in the western world.

Energy Efficiency Commitment: 1995 - 2000

> The mining sector is committed to improving its energy efficiency by 1.0 per cent per unit of output per year for the period 1995 to 2000.

Metal Mining Task Force

John Owen, Falconbridge Limited, Chairman
Milt Goble, INCO Manitoba Division
Peter McBride, Ontario Mining Association
Anthony Howard, Echo Bay
Keith Eldridge, Iron Ore Company
Kees Versfeld, Syncrude
Rick Green, Noranda
Gerry Villianotos, Falconbridge
John Lemay, INCO Ontario Division
Henry Smith, Williams Operating

Energy Efficiency Initiatives - Metal Mining

Inco Limited

Between 1990 and 1991, Inco's Ontario Division improved its energy performance by 20 per cent. Overall energy use per pound of copper and nickel produced improved by 7.2 per cent from 1992 to 1993 and another 3.9 per cent from 1993 to 1995.

Falconbridge Limited

Through a combination of capital and non-capital projects, the formation of energy management teams, changed purchasing specifications and senior management commitment, Falconbridge reduced energy consumption by 6.5 per cent between 1990 and 1994.

Energy efficiency increased by 15.5 per cent during the same period. Two Falconbridge plants are among the most energy efficient in the world.

Iron Ore Company of Canada (IOC)

Automation initiatives at the Carol Pellet Plant in Labrador City, Newfoundland are producing:

- fuel savings of 10 per cent and 6 per cent, respectively, for acid and fluxed pellets
- a pellet productivity increase of 5 per cent and an improvement on pellet quality

If this level of improvement continues, IOC expects to reduce bunker C oil consumption by 9 million litres per year and annual carbon dioxide emissions by 28 kilotonnes.

Cement

The cement sector is composed of nine companies. It consumed 1.8 per cent of total industrial energy in 1994.

In 1996, the sector is expected to expand to become the Industrial Minerals sector, with the inclusion of the two major glass producers in Canada and the membership of the Canadian Lime Institute.

Significant energy efficiency improvements were made in the late 1980's by the cement sector through extensive capital investments in new technology, which have extended capital cycles. Current efficiency gains have come mainly from operating practices.

Based on industry reporting, the sector showed an 8.5 per cent energy efficiency improvement between 1990 and 1994. This was achieved despite a sluggish economy, a slow-down in infrastructure and other construction activity and mandated increased use of electricity for environmental abatement, estimated to be about 2 per cent.

Production of cement and exported clinker for the period declined from a high of 11.5 million tonnes in 1990, to a low of 9.6 million tonnes in 1992. It rebounded to 11.4 million tonnes in 1994, helped in part by export sales to the U.S. market as that economy recovered sooner and stronger than in Canada. Cement and clinker exports were 4.0 million tonnes in 1993, and 4.8 million tonnes in 1994, a 20% increase.

The cement industry's energy use and production numbers for both 1990 and 1994 differ from those recorded by Statistics Canada. The most significant difference between the two surveys is the conversion rate used to determine the energy content of various fuels. In the industry survey, each respondent identified the energy content of the fuel reported. In the StatsCan survey, the companies provided information on the types of energy used and StatsCan applied a uniform conversion rate to calculate the energy content of each fuel classification. There were also less significant differences reported in both fuel usage and production. Because of known plant efficiency improvements in this period, the industry data is accepted as being more accurate.

Figure 26 compares total energy use, units of output, the sector's energy efficiency rate, and the overall energy efficiency index from 1990 through 1994.

Figure 26

Cement's Industry's Energy Efficiency: 1990 to 1994

Measure	1990		1994	
	StatsCan Data	Revised Industry Data	StatsCan Data	Revised Industry Data
Total Energy Use (Terajoules)	53,641	52,575	52,830	47,659
Production (tonnes)	11,542	11,107	11,418	11,001
Energy / Production (GJ/tonne)	4.647	4.734	4.626	4.332
Energy / Production Indexed	1.000	1.000	.995	0.915

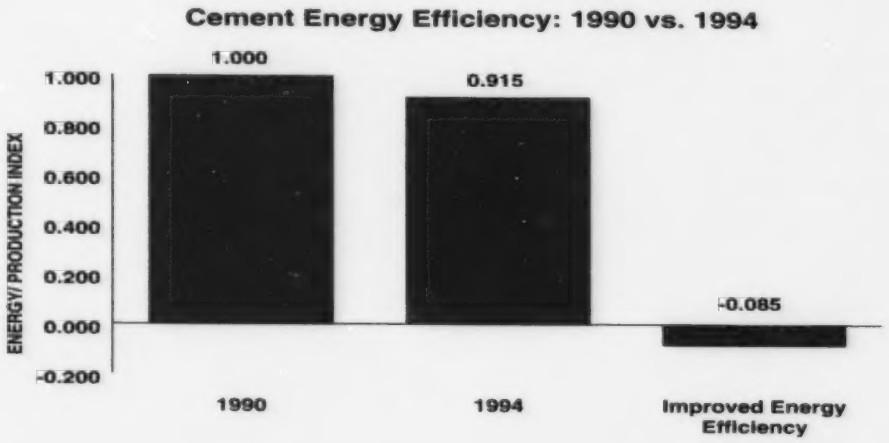
Source: StatsCan, NRCan, CIEEDAC, Cement Sector Task Force

CIPEC

Energy Efficiency by Sector - Tier 1 "Base"

Cement

Figure 27



Energy Efficiency Commitment: 1995 - 2000

The cement sector is committed to improving its energy efficiency by 0.7 per cent per unit of output per year for the period 1995 to 2000, as opportunities for additional efficiencies are essentially incremental.

Cement Task Force

John Lind, St. Mary's Cement Company, Chairman

Energy Efficiency Initiatives - Cement

Examples of changes which increased the energy efficiency of the cement industry during the period 1989 and 1994, include:

- the closing of a 300,000 tonne/year plant in Winnipeg and a 200,000 tonne/year plant in Regina based on old technology
- the retirement of a 150,000 tonne/year dry kiln in Exshaw, Alberta and two 170,000 tonne/year long dry kilns in Picton, Ontario
- the replacement of two 300,000 tonne/year wet kilns with a 1.4 million tonne/year preheater/precalciner kiln in Bowmanville, Ontario
- many modifications in process equipment and operating procedures.

CIPEC

Energy Efficiency by Sector - Tier 1 "New Reporting"

There are three Tier 1 "New Reporting" Sectors - oil sands/upgraders, non-metal mining, and glass. These are the sectors for which data was collected for the first time in 1994 through the ICE Survey.

In 1994, these three sectors consumed 9.0 per cent of all energy used by industrial companies. All three sectors increased the amount of energy consumed between 1990 and 1994.

Figure 28

Manufacturing and Mining Energy Use by Sector: 1990 and 1994

Tier 1 "New Reporting"	1990 Terajoules	% of Total	1994 Terajoules	% of Total	% Change
Oil Sands/Upgrader	145,932	5.6%	189,350	7.1%	29.75%
Non Metal mining	38,740	1.5%	39,679	1.5%	2.42%
Glass	12,105	0.5%	14,103	0.5%	16.51%
Sub Total	**196,777**	**7.6%**	**243,132**	**9.1%**	**1.5%**

Source: NRCan

Energy Efficiency Performance

Tier 1 "New Reporting" Sectors	Increase (Decrease) in Energy Efficiency*
Oil Sands/Upgraders	13.21%
Non Metal mining	2.67%
Glass	(4.9%)

Source: StatsCan, NRCan, Sector Task Force
* A ( ) sign = less efficient

Each of the Tier 1 "New Reporting" status reports presented below has been approved by its Sector Task Force and/or the related trade association. This year's report should be considered the official version because of the greater accuracy achieved in the data with the introduction of the ICE Survey and with reporting refinements initiated by the industry sectors and StatsCan.

The report identifies for each of the years from 1990 through 1994:

- the amount of energy used in Terajoules,
- the units of output for each sector,
- the energy efficiency rate (energy use divided by units of output), and
- the sector's energy efficiency index (a comparison based on 1990 equaling 100).

The objective is to show the energy efficiency performance of each sector from 1990 through 1994 and to identify the annual energy reduction commitment of each sector from 1995 to 2000

CIPEC

Energy Efficiency by Sector - Tier 1 "New Reporting"

Oil Sands/Upgrader

The two oil sands plants, located in northern Alberta, and one heavy oil upgrader in Saskatchewan, while part of the petroleum refining sector, are reported upon separately this year under the Tier 1 "New Reporting" category. This is the first year the oil sands / upgrader sector is being reported on by CIPEC.

The oil sands/upgrader sector consumed 7.0 per cent of total industrial energy in 1994. Together these three plants produce over 300,000 barrels of synthetic crude oil per day for markets in the United States and Canada. They employ over 20,000 Canadians directly and another 100,000 indirectly.

Synthetic crude oil production increased between 1990 and 1994 by over 49.5 per cent but energy use increased by only 29.5 per cent. As a result, the oil sands/upgrader energy efficiency (energy use divided by output, measured in cubic metres) improved by a significant 13.21 per cent over the period.

Figure 29

Oil Sands/Upgrader Energy Efficiency: 1990 to 1994

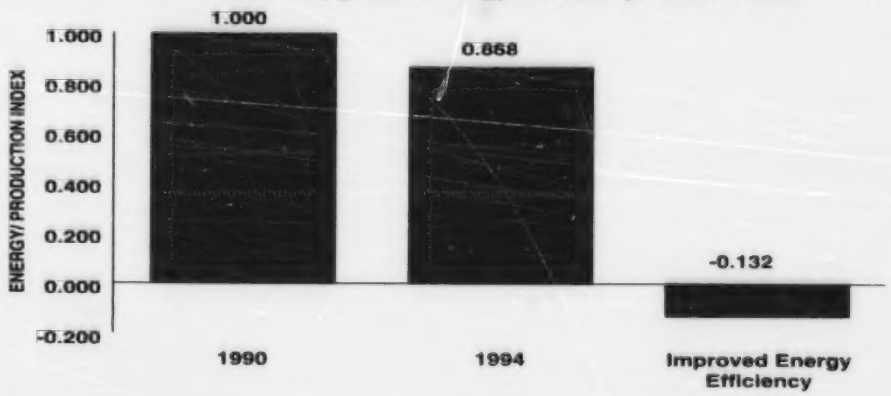
Measure	1990	1994
Total Energy Use (Terajoules)	145,932	189,350
Production (Cubic metres)	11,951	17,865
Energy / Production (GJ/Cubic metres)	12.212	10.599
Energy / Production Indexed	1.000	0.868

Source: StatsCan, NRCan, CIEEDAC, Petroleum Refining Sector Task Force

This has been accomplished by an aggressive program to improve plant reliability which is key to achieving energy efficiency. As well, improvements in the extraction process, the increased recovery and use of waste heat, increased yields in the processing units and the introduction of new technologies in the mining stage of operations have all contributed to improved energy efficiency.

Figure 30

Oil Sands/upgrader Energy Efficiency: 1990 to 1994



CIPEC

Energy Efficiency by Sector - Tier 1 "New Reporting"

Oil Sands/Upgrader

Oil Sands/Upgrader Energy Efficiency Commitment: 1995 - 2000

> The oil sands/upgrader sector is committed to improving its energy efficiency by 1.0 per cent per unit of output per year for the period 1995 to 2000.

The industry is confident that it will deliver on its commitment through further implementation of advanced process control, operating improvements, training and selected capital investments.

The oil sands sector, while increasing production, will continue to apply new technologies and to focus on reliability in order to drive down the energy consumed per unit of production.

Oil Sands/Upgrader Task Force

The Petroleum Refining Task Force (See page 25) oversees the activities of the Oil Sands/Upgrader sector.

Energy Efficiency by Sector - Tier 1 "New Reporting"

Non-Metal Mining

The non-metal mining sector consumed 1.5 per cent of total industrial energy use in 1994. It includes asbestos, potash, salt and miscellaneous mines. Figure 31 compares the sector's energy efficiency for 1990 and 1994.

Figure 31

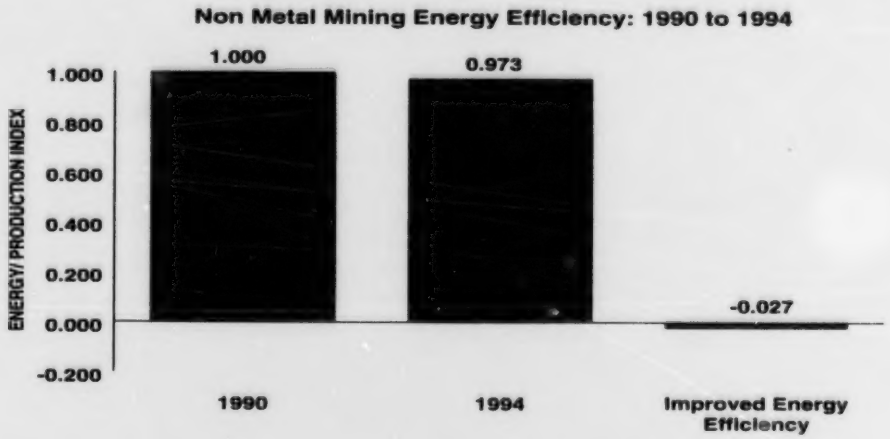
Non-Metal Mining Energy Efficiency: 1990 to 1994

Measure	1990	1994
Total Energy Use (Terajoules)	33,831	37,069
Production (tonnes)	23,070	24,278
Energy / Production (GJ/tonnes)	1.466	1.634
Energy / Production Indexed	1.000	0.973

Source: StatsCan, NRCan, CIEEDAC.

Between 1990 and 1994, the non-metal mining sector increased its energy efficiency by 2.67 per cent. It is expected that next year the potash sector will be reported through a new "Chemical Fertilizer" Task Force.

Figure 32



CIPEC

Energy Efficiency by Sector - Tier 1 "New Reporting"

Glass

In 1994, the glass sector consumed 0.5 per cent of total industrial energy.

Negotiations are underway with key members of the glass industry to participate in CIPEC as part of the Industrial Minerals Task Force, to set an annual energy reduction target and to report progress.

Figure 33

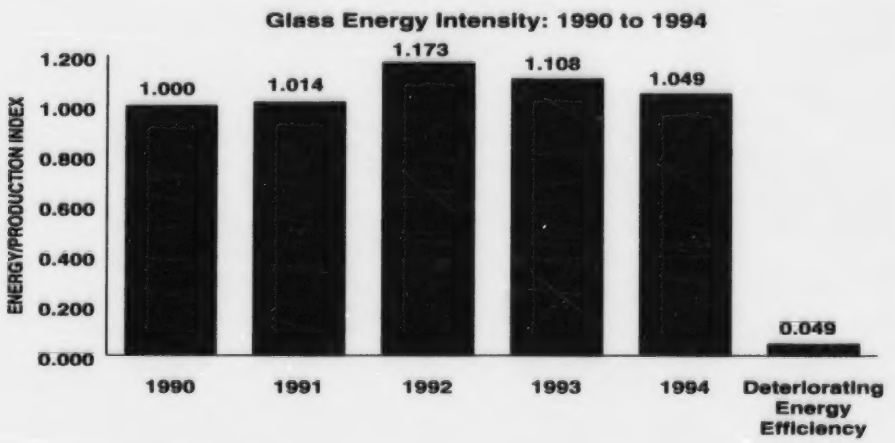
Glass & Glass Products Energy Intensity: 1990 to 1994

Measure	1990	1991	1992	1993	1994
Total Energy Use (Terajoules)	12,105	11,418	14,023	14,440	14,103
Production (GDP '000 '86$)	572	532	565	616	635
Energy / Production (GJ/$)	21.17	21.47	24.83	23.43	22.22
Energy / Production Indexed	1.000	1.014	1.173	1.110	1.050

Source: StatsCan, NRCan, CIEEDAC.

Between 1990 and 1994, the glass sector's energy intensity deteriorated by 4.9 per cent.

Figure 34



CIPEC

Energy Efficiency by Sector - Tier 2 And All Other Sectors

Tier 2 companies and in all other sectors consumed 21 per cent of all industrial energy used in 1994. See Appendix 1 for a list of these sectors. CIPEC has not previously reported on Tier 2 companies because there was no reliable database.

Figure 35

Industrial Energy Use by Sector: 1990 and 1994

	1990 Terajoules	% of Total	1994 Terajoules	% of Total	% Change
Tier 1 "Base" Sub Total	**1,770,054**	**68.1%**	**1,866,468**	**69.7%**	**1.6%**
Tier 1 "New Reporting" Sub Total	**196,777**	**7.6%**	**243,132**	**9.1%**	**1.5%**
All Other Sectors including Tier 2	**631,534**	**24.3%**	**569,188**	**21.2%**	**-3.1%**
All Industry	**2,598,365**		**2,678,788**		**3.1%**

Source: StatsCan and Sector Task Forces

Beginning in 1996, CIPEC will be reporting on 13 Tier 2 sectors using the results of the 1995 ICE Survey and the relationships between CIPEC and the trade associations representing Tier 2 companies. (Tier 2 sectors involved are shown in Figure 36.)

Figure 36

Tier 2 Sectors		All Other Industrial Sectors
Breweries Textiles Transportation	Chemical Fertilizers Electrical and Electronics Food Industry • Bakery • Dairy • Fruit and Vegetables • Meat and Poultry Foundries General Manufacturing • Clothing • Furniture • Leather/Allied • Machinery • Printing/Publishing • Tobacco • Metal Fabrication • All other Plastics Rubber Wood Products	See Appendix 1 on page 71

This year partial information is available on only three Tier 2 sectors - breweries, textiles, and transportation - from 1990 to 1993.

Brewery Products

Industry data suggests that, over the four year period 1991 to 1994, a 9 per cent energy efficiency improvement was achieved. The units of measurement for energy efficiency are megajoules of energy per hectoliter of beer produced.

Figure 37, however, is based on StatsCan information and compares total energy use, units of output, the sector's energy efficiency rate, and the overall energy efficiency index from 1990 through 1993.

Brewery Products Industry's Energy Efficiency: 1990 to 1993

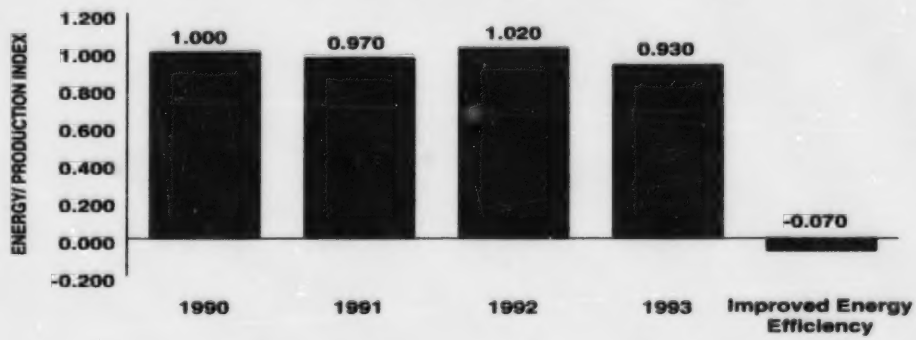
Measure	1990	1991	1992	1993
Total Energy Use (Terajoules)	7,403	7,032	7,222	6,716
Production (Millions of hectolitres [Mhl])	22.6	22.1	21.6	22.1
Energy / Production (MJ/Mhl)	327.6	318.2	334.4	303.9
Energy / Production Indexed	1.000	0.970	1.020	0.930

Source: StatsCan, NRCan, CIEEDAC, Sector Task Force

Figure 37
As Figure 38 illustrates the sector's energy efficiency over this three year period improved by 7 per cent.

Figure 38

Brewery Products Energy Efficiency: 1990 to 1993



Energy Efficiency Commitment: 1995 - 2000

> The brewery sector is committed to improving its energy efficiency by 3.0 per cent per unit of output per year for the period 1995 to 2000

The Brewing task force consists of representatives from Labatt, Molson, Moosehead and Sleeman Breweries. Together these companies represent 90 per cent of brewing capacity in Canada.

Brewery Products

Brewery Task Force

Ralph Backman, Labatt Breweries of Canada, Chairman
Tomas Lom, Molson Breweries
Peter Henneberry, Moosehead Breweries
Al Brash, Sleeman Breweries

Energy Efficiency Initiatives - Brewery Products

In the past year, the industry has undertaken a variety of activities to boost this already strong performance. For example, Labatt has implemented specialized energy opportunity training through CIET (Canadian Industry Energy Training) for all of its brewery managers.

Molson has instituted a pilot monitoring and tracking program in conjunction with Ontario Hydro. Over 125 energy cost centres are involved in one location. Annual energy savings in excess of $750,000 are being achieved.

Moosehead is participating in the federal On-Site program, a special Unemployment Insurance program, that provides Moosehead with qualified energy management professional for six months at a cost of only $100 per week, to help draft and install an energy management program.

Energy Efficiency by Sector - Tier 2

Textiles

Canada's textile industry has annual sales of over $8 billion, including the export of product worth more than $2 billion. The industry includes producers of man-made fibres and filament yarns, spun yarns, fabrics, and a wide range of textile products for the consumer and about 150 customer industries. These include agriculture, automotive, clothing, construction, environmental protection, and road building.

Over the past 15 years the industry has been transformed through substantial and sustained capital investment. While not a significant energy user, the textile industry's annual energy bill is approximately $200 million.

From 1974 to 1990, the textile industry reduced its energy use per unit of production by 29.8 per cent.. Between 1990 and 1993, however, the industry's energy intensity increased by 11.1 per cent. See Figures 39 and 40.

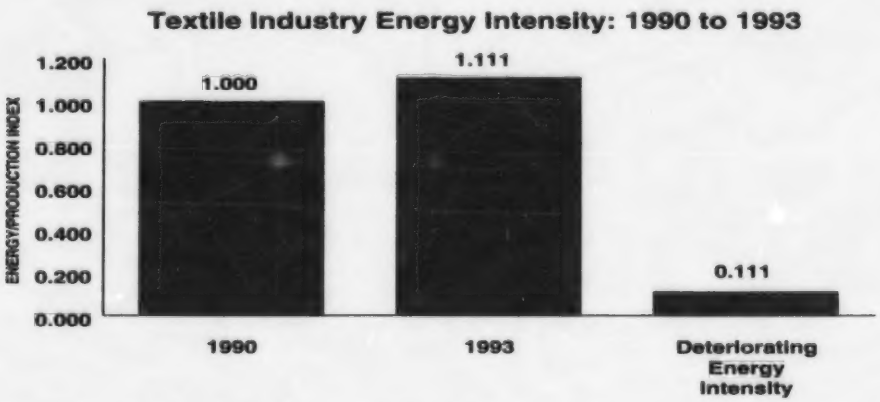
Figure 39

Textile Industry's Energy Intensity: 1990 to 1993

Measure	1990	1993
Total Energy Use (Terajoules)	20,939	21,399
GDP (M '86$)	1,991	1,831
Energy / Production (GJ/GDP)	10.52	11.69
Energy / Production Indexed	1.000	1.111

Source: StatsCan, NRCan, CIEEDAC, Sector Task Force

Figure 40



Energy Efficiency Commitment: 1995 - 2000

The textile sector is committed to improving its energy efficiency by 2.0 per cent per unit of output per year for the period 1995 to 2000.

Textiles

Textile Energy Task Force

Peter Chantraine, DuPont Canada Inc., Chairman
Eric Barry, Canadian Textile Institute
Abraham Turkson, Albarrie Canada Limited
Jacques Boutin, Consoltex Inc.
Cécile Miclette, Albarrie Environmental Services
Louise Métivier, Natural Resources Canada
Gilles Charron, Dominion Textile Inc.
René Nantel, Peerless Carpet Corporation
Ian Campbell, NRCan
Pierre Beeks, J. L. de Ball Canada Inc.
Roger Leclerc, Centre des technologies textiles
Pierre de Broux, Intech PEM Inc.

Energy Efficiency Initiatives - Textiles

In the past year, the Textile Energy Task Force has:

- set a textile industry energy reduction target of 10 per cent per unit of production for the period 1996 to 2000
- developed an action plan which has been approved by the Canadian Textile Institute's Board of Directors
- invited every company in the industry to become an Industrial Energy Innovator and a participant in Canada's Voluntary Challenge and Registry program
- planned regional workshops for early in 1996 to provide individual firms with the knowledge required to establish energy efficiency programs.

Swift Textiles Inc., Drummondville

Swift Textiles invested $150,000 in energy efficiency measures, involving little equipment or technical modifications. After one year, energy savings of $192,300 were achieved. The approach was to obtain the active participation of all hourly paid employees and management and to raise awareness, and importance, of energy conservation in the plant and at home.

Transportation (Manufacturing)

The Transportation Task Force, established in the early seventies, draws its membership from six associations representing automotive and trucks, automotive parts, aerospace and marine industries.

In 1990, Chrysler, Ford and General Motors consumed 71 per cent of the reported energy used by this sector. Since 1990, in spite of continuing economic uncertainty, in excess of $7 billion has been invested in new paint and assembly facilities and major retooling by these three companies.

In the automotive parts sector, which accounts for 17 per cent of the energy reported in 1990 for this sector, there has been considerable restructuring, resulting in fewer, but larger companies exporting over 85 per cent of their production to the U.S., Mexico, Europe and Asia.

Figure 41 below compares the industry's energy efficiency for the years 1990 through 1993.

Figure 41

Transportation Industry's Energy Efficiency: 1990 to 1993

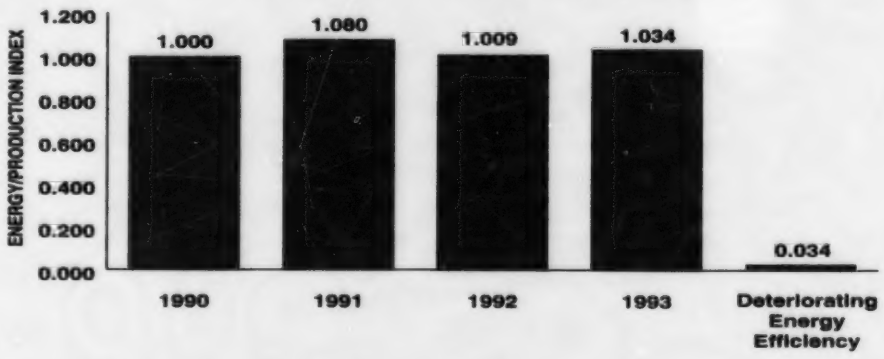
Measure	1990	1991	1992	1993
Total Energy Use (Terajoules)	41,217	41,740	42,856	48,846
Total Vehicles (000 units)	1,748	1,639	1,802	2,003
Energy / Production (GJ/'000 units)	23.58	25.47	23.78	24.39
Energy / Production Indexed	1.000	1.080	1.009	1.034

Source: StatsCan, NRCan, CIEEDAC, MVMA Sector Task Force

In essence, energy efficiency in the transportation (manufacturing) sector deteriorated over the period by about 3 per cent. The automotive sector is highly vulnerable to economic cycles and its performance is generally regarded as a leading economic indicator.

Figure 42

Transportation Energy Efficiency: 1990 to 1993



Energy Efficiency Commitment: 1995 - 2000

The transportation sector is committed to improving its energy efficiency by 1.0 per cent per unit of output per year for the period 1995 to 2000.

Transportation (Manufacturing)

Transportation Task Force

Ken Rossi, *Ford Motor Co. of Canada, Chairman*
Ralph Davies, *Hayes-Dana*
Thomas Graham, *General Motors*
Dave Cherney, *CAMI*
Mark Cotter, *Automotive Parts Manufacturers' Association*
Peter Corbyn, *Woodbridge Foam*
Paul Hansen, *Chrysler Canada*
Ian Campbell, *NRCan*

Energy Efficiency Initiatives - Transportation

The Transportation sector:

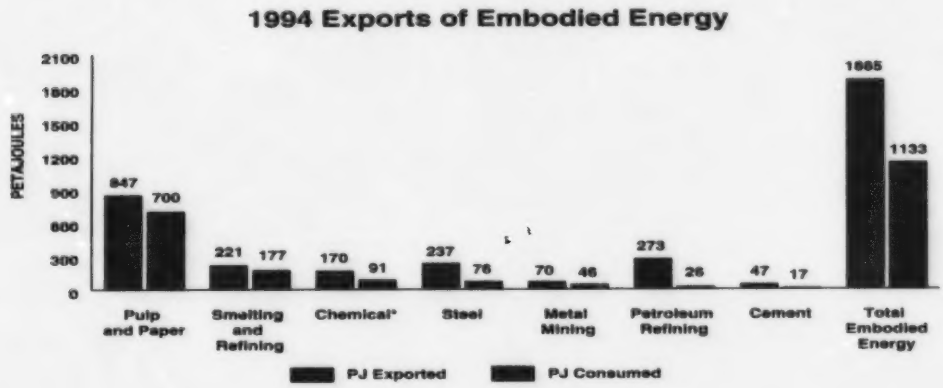
- has broadened its sector membership as a result of its exceptional response to the Industrial Energy Innovator program
- in the coming year will be re-issuing the "Idea Exchange" and promoting energy conferences. The program will be launched initially with examples from the automotive industry where many of the traditional initiatives such as lighting replacement, high efficiency motors, compressor controls, variable speed drives and energy management systems are already in place and proving energy and cost efficient
- will share case studies on insulation, retrofit burners, sand reclamation and, perhaps, most important, process changes in casting operations which enable energy reductions in the machining process
- will encourage companies in the sector which do not have an energy reporting and data analysis system in place to adopt one. The theme will be: "If you can't measure it — you can't manage it".

CIPEC

Exports of Embodied Energy: 1994

Canada is a major exporter, particularly of processed or semi-processed natural resources. As a result, Canada exports a significant amount of the energy used in the production of manufactured or refined products. This is called "embodied energy".

Figure 43



* Historic and forecast energy use data shown in this report for the chemical sector are based on StatsCan's ICE survey as for other CIPEC sectors. The Canadian Chemical Producers' Association (CCPA) annual Reducing Emissions report covers emissions and projections for all greenhouse gases for all its members. The CCPA methodology does not correspond directly with the energy use data reported by StatsCan.

Seven industrial sectors - pulp and paper, smelting and refining, chemicals, steel, metal mining, petroleum refining, and cement, as a group - exported over 60 per cent of their output in 1994, including 1,133 petajoules of embodied energy.

Unfortunately, these exports of energy are not yet taken into account when comparing one country's energy consumption with another. The usual measurement is per capita consumption of energy. As a result, Canada is frequently characterized as the industrialized world's "energy hog".

Per capita comparisons which do not take into account embodied energy contained in exports are simplistic and an inaccurate way to compare one country's energy efficiency performance with another.

Rather than measuring per capita consumption, a better measure is the amount of energy used to produce a unit of production. This is a true reflection of energy efficiency.

On this basis, Canadian industrial companies compare very favourably with industries in other countries. For example, Inco's Sudbury Division is the most energy efficient nickel producer in the world. And, on an overall cost of production basis, Falconbridge's Integrated Nickel is the world's lowest cost nickel producer.

Unfortunately, Canada is one of the few jurisdictions which measures energy efficiency per unit of production. Canadian industry must be vigilant that others, including government, do not perpetuate the measurement of energy on a per capita consumption basis.

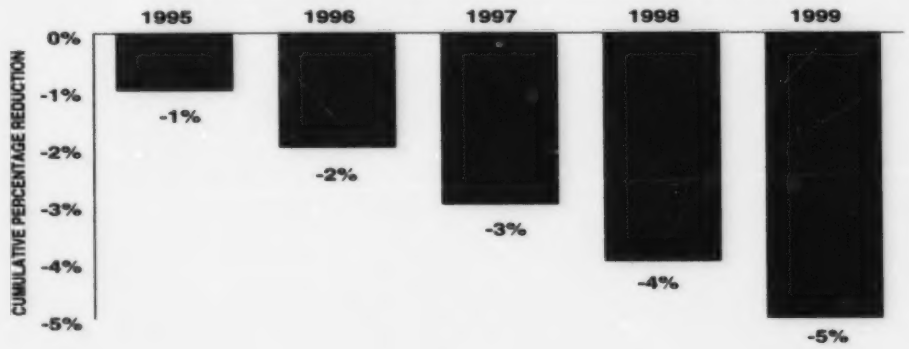
CIPEC

Energy Efficiency Commitment : 1995 to 2000

Canada's industrial companies have committed to a one per cent reduction per year in energy consumption per unit of production between 1995 and 2000, a 5 per cent cumulative reduction over the period.

Figure 44

Manufacturing and Mining's Cumulative Energy Efficiency Commitment Per Unit of Production: 1995 to 2000



This commitment is based on a sector by sector evaluation of what is possible by 11 industrial sector task forces.

Energy Reduction Commitment By Sector

Thirteen sectors have established annual energy efficiency improvement targets per unit of production for the period 1995 to 2000.

Figure 45

Industrial Sector	Annual Percentage Energy Efficiency Improvement Targets: 1995 - 2000
Brewery	3.0%
Cement	0.7%
Electrical/Electronics	1.0%
General Manufacturing	1.0%
Metal Mining	1.0%
Petroleum Refining	1.0%
Plastics	1.0%
Pulp & Paper	1.0%
Smelting and Refining	1.0%
Steel	1.0%
Textiles	2.0%
Transportation	1.0%
Wood Products	1.0%
Aggregate Commitment	**1.0%**

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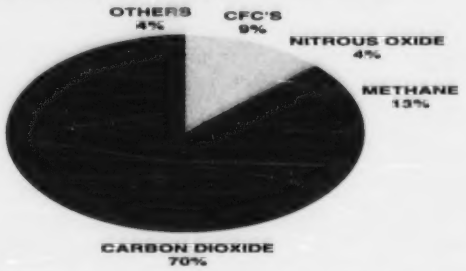
Carbon Dioxide and Greenhouse Gas Emissions

Greenhouse gases include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and chlorofluorocarbon (CFC's). Carbon dioxide is the most important greenhouse gas because it accounts for about 70 per cent of the infrared absorption due to all greenhouse gas emissions.

Figure 46

Distribution of Total Canadian Greenhouse Gas Emissions by Type of Gas: 1990



In 1990, Canada contributed about 2 per cent of global carbon dioxide emissions, of these approximately 94 per cent were attributable to the combustion of fossil fuels and, of this, only 20 per cent was attributed to manufacturing and mining companies.

Industry's Carbon Dioxide Emissions Performance: 1990 to 1994

Agreement on the amount of carbon dioxide and other greenhouse gases emitted by industry is an important element of a successful voluntary energy efficiency program. CIPEC is working with Environment Canada, StatsCan, Natural Resources Canada, and CIEEDAC to identify the amount of carbon dioxide emitted by industry.

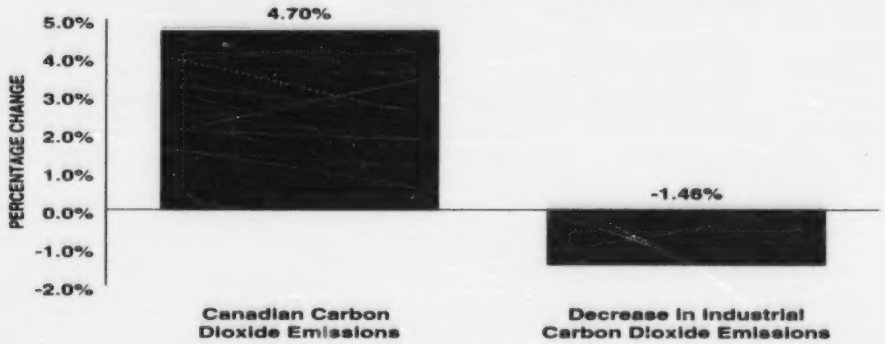
Environment Canada is responsible for calculating Canada's official carbon dioxide and other greenhouse gas emissions statistics and for maintaining the official inventory.

According to Environment Canada, total carbon dioxide emissions in Canada for all sectors of the economy increased over the period 1990 to 1994 by 4.7 per cent or 21,496 Kilotonnes. Environment Canada's definition of industry includes emissions from energy consumed by industry and the forestry and construction industries.

When forestry and construction are removed from Environment Canada's carbon dioxide statistics, industrial carbon dioxide emissions declined by 1.46 per cent over the period 1990 to 1994, or a total reduction of 1,350 kilotonnes.

Figure 47

Change in Canadian Carbon Dioxide Emissions Compared With Change in Industrial Emissions: 1990 to 1994

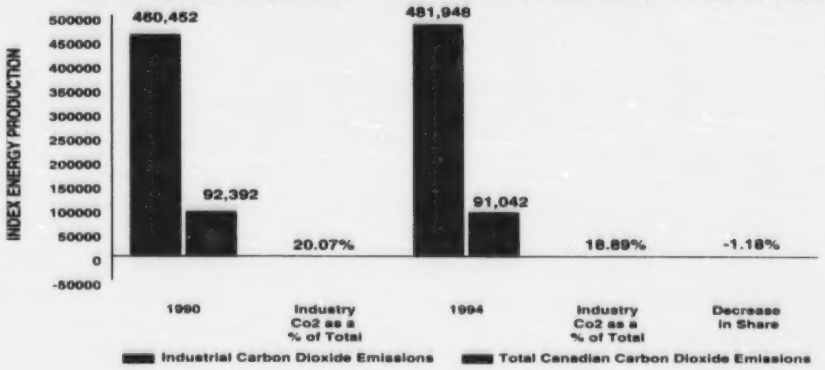


Industry's Carbon Dioxide Emissions Performance: 1990 to 1994

Industry's share of total Canadian carbon dioxide emissions has declined from 20.07 per cent in 1990 to 18.89 per cent in 1994, a decline of 1.18 percentage points.

Figure 48

Industry Carbon Dioxide Emissions From Stationary Fuel Consumption Compared to Total Canadian Emissions: 1990 to 1994



In addition to defining industry differently, Environment Canada does not yet have access to the data collected by the Industrial Consumption of Energy (ICE) Survey. This restricts the accuracy of the data base from which it calculates carbon dioxide emissions.

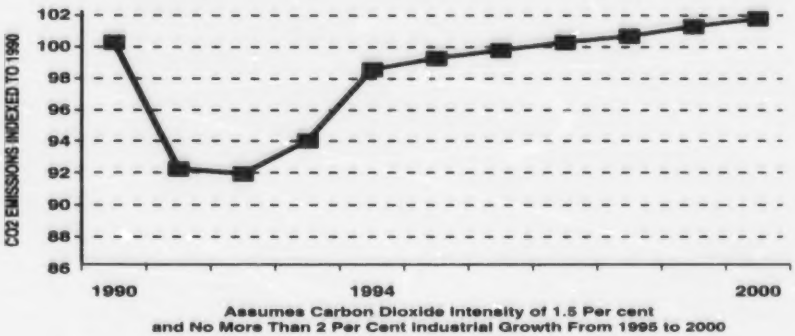
As well, Environment Canada and CIEEDAC do not calculate emissions in comparable ways. This, too, accounts for differences in CIPEC's carbon dioxide emission data from that of Environment Canada.

These differences are being resolved and there should be complete comparability between CIEEDAC and Environment Canada for 1996 data.

Figure 49 illustrates the decline in industrial carbon dioxide emissions between 1990 and 1994. If the same annual carbon dioxide intensity of 1.5 per cent is maintained between 1995 and 2000, and if the annual industrial GDP growth rate does not exceed 2 per cent, industry's carbon dioxide emissions will exceed 1990 levels in 2000 by 1.6 per cent, if it does not adopt accelerated procedures.

Figure 49

Industrial Carbon Dioxide Emissions 1990 to 1994 and Projected 1995 to 2000 Emissions Based on 1990 and 1994 Intensity and a 2 Per Cent Annual Industrial GDP Growth



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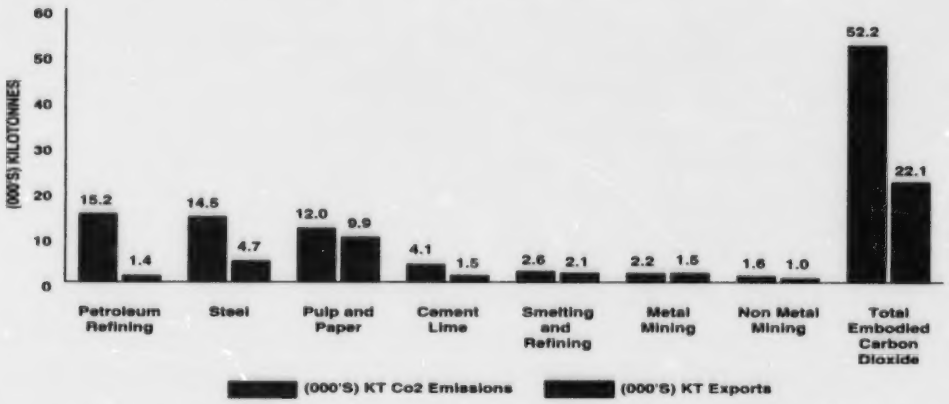
Exports of Embodied Carbon Dioxide

In 1990 industrial carbon dioxide emissions totaled 92,392 kilotonnes. This level decreased to 91,042 kilotonnes by the end of 1994, or 1.46 per cent less.

Figure 50 ranks the principal industrial sources for carbon dioxide emissions in 1994 from stationary sources. Seven industrial sectors - petroleum refining, steel, pulp and paper, cement, smelting and refining and non-metal mining - produced approximately 52 per cent of all industrial carbon dioxide emissions. These seven sectors, as a group, exported 42 per cent of their production, including 22,100 kilotonnes of embodied carbon dioxide.

Figure 50

1994 Exports of Embodied Carbon Dioxide



Source: CIPEC and CIEEDAC (for carbon dioxide emission estimates by sector)

It is CIPEC's view that embodied carbon dioxide should be credited to the account of the importing country for purposes of determining per capita "consumption" of carbon dioxide.

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Climate Stabilization: Post 2000

In 1992, with the signing of the United Nations Framework Convention on Climate Change (the Rio Accord), Canada committed to stabilize carbon dioxide emissions at 1990 levels by the year 2000 and to prepare a National Action Program on Climate Change (NAP).

In addition to carbon dioxide stabilization, the United Nations Framework Convention on Climate Change (the Rio Accord) focused on stabilization of other greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system (climate stabilization).

While Canada has not committed to specific climate stabilization targets, the dimensions of the challenge are becoming clearer.

In 1990, the Intergovernmental Panel on Climate Change (IPPC) - a panel of scientists and policy makers from around the world - suggested that climate stabilization would require reducing carbon dioxide emissions to 50 per cent of their 1985 levels by 2050.

The federal Liberal Party's Red Book states that Canada should reduce carbon dioxide emissions 20 per cent from its 1988 levels by the year 2005.

The Rio Accord's climate stabilization goal, notwithstanding, the future of Canada's economy is a shared responsibility of industry and government, just as much as the ensuring of a healthy environment is a shared responsibility.

In April 1995, the Berlin Conference of Parties established a two year process (1995 to 1997) during which international negotiations would be undertaken in an effort to establish new GHG emission reduction targets for the years 2005, 2010 and 2020.

Projecting the Carbon Dioxide Emissions Gap Post 2000

Given this process, a study was commissioned designed to provide a preliminary understanding of the greenhouse gas emissions "gap" which is likely to exist, if any, with respect to four specific reduction targets now being proposed:

- a 20 per cent reduction of CO2 from 1990 levels by the year 2005 (proposed by AOSIS - Alliance of Small Island States)
- the maintenance of 1990 GHG levels indefinitely after 2000 (proposed by the European Union)
- a 10 per cent reduction of GHG emissions by 2010 (proposed by the UK)
- a 20 per cent reduction in CO2 emissions from 1988 levels by the year 2005 (page 70, Creating Opportunities: The Liberal Plan for Canada)

The schematic Figure 51, illustrates the relationship of each of these proposed targets relative to the 1990 base year.

In each case, the study assumed voluntary GHG emission reductions and a "no regrets" - "best efforts" approach, based on cost effective investments and the maintenance of relative competitiveness.

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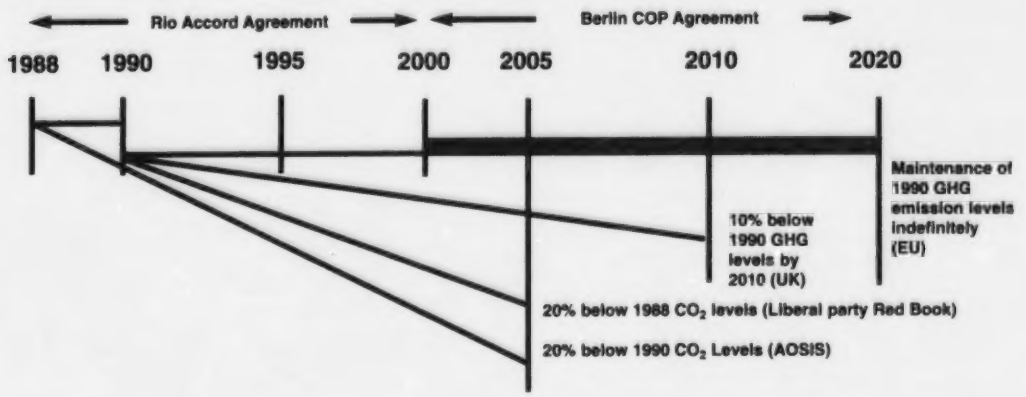
Projecting the Carbon Dioxide Emissions Gap: Post 2000

The study is a preliminary assessment and gives industry leaders in the major energy consuming industrial sectors an appreciation of the GHG emission reduction targets.

Figure 51



To ensure the assumptions used in the study reflect the realities of each industry sector an advisory group (Panel of Experts) was established including:

- economists and/or other representatives from each of major energy consuming industrial sectors:
  - pulp and paper
  - petroleum refining
  - steel
  - chemicals
  - aluminum and non-ferrous
  - mining and metallurgy
  - cement and lime
  - wood products
- representatives from the energy supply industry (oil, natural gas and electricity)
- a representative from NRCan
- a representative from Environment Canada
- a representative from the Business Council on National Issues (BCNI).

The Panel of Experts was requested to provide information on:

- the outlook for overall economic growth, inflation, interest rates, and other relevant indicators for their sectors
- the likely future performance of individual industry sectors
- whether their sector is likely to represent a larger or smaller part of the economy in the future
- likely changes in technology and energy efficiencies in their sector.

- their views on realistic assumptions about the plans of Canada's major trading partners as they relate to their sectors.

Key Assumptions

Dr. Ernest Stokes, Stokes Economic Consulting, was responsible for the study. The following actual and projected GDP growth rates and energy intensity rate assumptions were used in the study.

Figure 52

Actual and Projected Industrial Growth/Carbon dioxide GDP:

Study Assumptions	Actual 1991 - 1994	Projection 1995 - 2000	Projection 2001 - 2010
Consensus Growth	1.3%	3.1%	2.3%
Consensus Carbon dioxide Intensity	-1.5%	-0.8%	-0.8%
Low Growth	1.3%	2.1%	1.3.%
Low Growth Carbon dioxide Intensity	-1.5%	-0.7%	-0.7%
High Growth	1.3%	4.3%	3.3%
High Growth Carbon dioxide Intensity	-1.5%	-1.0%	-1.0%

In addition it was agreed that:

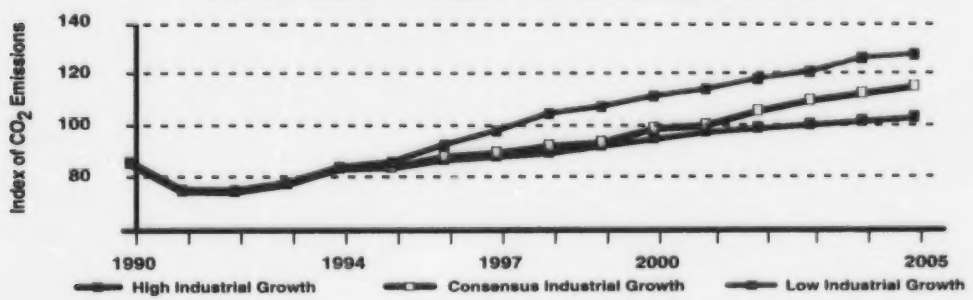
- industry would introduce new technology only when it is economic
- industrial carbon dioxide is defined as emissions originating from fuel consumption from stationary sources and from process carbon dioxide emissions. No industrial electricity use is included.

Study Findings

Figure 53 illustrates the projected carbon dioxide emissions based on the consensus assumptions, a high case and a low case.

Figure 53

Carbon Dioxide Emission Projections: 1995 to 2005



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Projecting the Carbon Dioxide Emissions Gap: Post 2000

Study findings: Carbon dioxide emissions

Post 1995, a carbon dioxide intensity reduction of 0.8 per cent per year is more likely than the 1.5 per cent experienced from 1990 to 1994. Given this, the projected carbon dioxide gap for each of the three cases is set out in Figure 54.

Figure 54

	Low case		Base case		High case	
1995 to 2000	GDP	Carbon dioxide Intensity	GDP	Carbon dioxide Intensity	GDP	Carbon dioxide Intensity
	2.1%	-0.7%	3.1%	-0.8%	4.1%	-1.0%
	Carbon dioxide gap	7.5%	13%		19%	

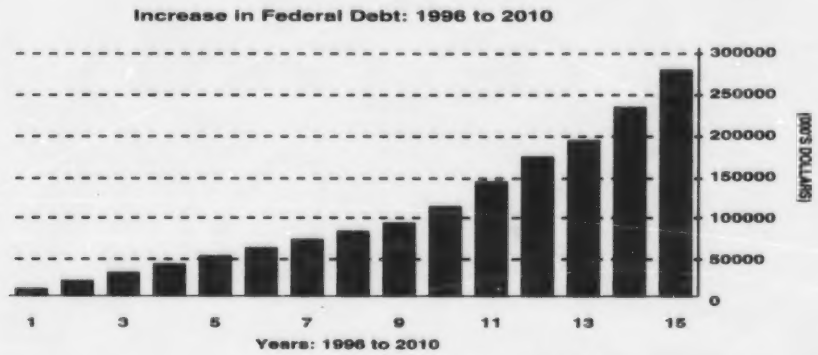
	Low case		Base case		High case	
2001 to 2005	GDP	Carbon dioxide Intensity	GDP	Carbon dioxide Intensity	GDP	Carbon dioxide Intensity
	2.1%	-0.7%	3.1%	-0.8%	4.1%	-1.0%
	Carbon dioxide gap	11%	22%		33%	

	Low case		Base case		High case	
2006 to 2010	GDP	Carbon dioxide Intensity	GDP	Carbon dioxide Intensity	GDP	Carbon dioxide Intensity
	2.1%	-0.7%	3.1%	-0.8%	4.1%	-1.0%
	Carbon dioxide gap	15%	31%		50%	

Study Findings: Federal Debt Growth

Federal debt is projected to grow by $270 billion between 1996 to 2010 if Canada reduces industrial output to the low growth case in order to reduce carbon dioxide emissions to a level which is still 15 per cent above 1990 levels.

Figure 55



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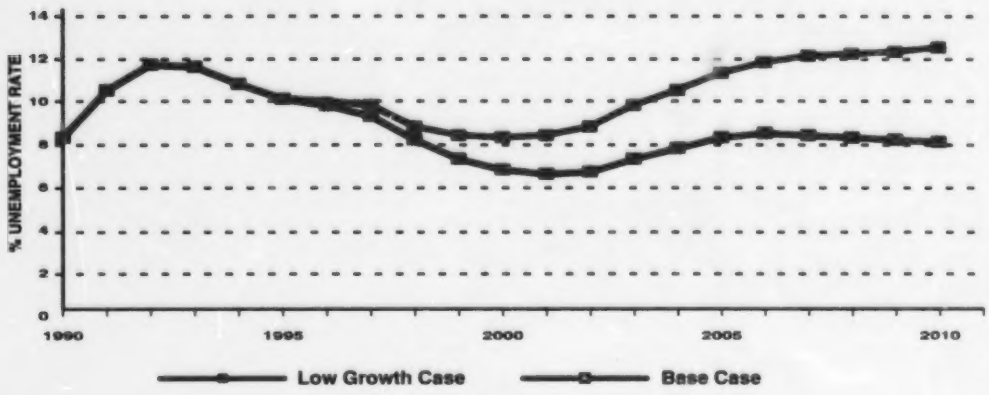
Projecting the Carbon Dioxide Emissions Gap: Post 2000

Study Findings: Unemployment Rate

Unemployment is projected to increase to 12.3 percent by 2010 if Canada reduces industrial output to the low growth case in order to reduce carbon dioxide emissions to a level which is still 15 per cent above 1990 levels.

Figure 56

Canada's Projected Unemployment Rates: 1996 to 2010



Study Conclusions

- Even if industry's carbon dioxide emission intensity continues at 1.5 per cent per year beyond 2000, industrial GDP could not grow more than 1.5 per cent a year in order to maintain carbon dioxide emissions at 1990 levels
- If Canada agrees to carbon dioxide (GHG) emission targets below 1990 levels, it will require, either:
- significantly lower annual industrial GDP growth rates, with attendant unemployment, increased government debt, and/or reduced government spending, or
- compensating reductions in carbon dioxide emissions by other sectors of the economy: residential, transportation, commercial, agriculture, etc.
- Three of the four proposed targets - (i.e., AOSIS, federal Liberal Party and the UK proposal) - for reduced carbon dioxide / greenhouse gas emissions beyond 2000 can be achieved only if Canada experiences negative industrial GDP growth

  The fourth target (EU) can be achieved only with an annual industrial GDP growth rate of less than 1 per cent
- Canada should not agree to more stringent annual or short term greenhouse gas emission targets beyond 2000.

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Projecting the Carbon Dioxide Emissions Gap: Post 2000

Study Conclusions

- Industrial energy users, provinces, the federal departments of Finance, NRCan, Environment, Industry, and Foreign Affairs must coordinate their efforts in developing Canada's negotiating position on new greenhouse gas emission targets post-2000

- Industry has a responsibility to seek out all "no regrets" opportunities which would reduce energy consumption and related GHG emissions between 1995 and 2000.

In view of the foregoing, it appears as though greenhouse gas emission targets are as much an economic, trade, jobs, standard of living, issue as it is an environmental issue. As such, Canada cannot afford to treat these international GHG negotiations as a single item agenda.

As well, even if the GDP growth rate projections were halved and the carbon dioxide intensity rates were doubled, it still would not be possible to meet the four proposed reduction targets.

Proposed next steps

- Industry should establish a mechanism to present to government at the highest level the implications to Canada of more stringent greenhouse gas emission targets post 2000

CIPEC Services To Industry

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Canadian industry, through CIPEC, works with government and other stakeholders in a voluntary initiative to improve energy efficiency and, thereby, to improve industrial competitiveness and help achieve Canada's greenhouse gas emission stabilization goals.

CIPEC provides a variety of services to industry, including:

- establishment of accurate and reliable baseline data collection and tracking systems
- supporting industry establish voluntary, sector by sector energy efficiency improvement targets and track progress towards those goals
- identifying opportunities for technology transfer
- the Industrial Energy Innovator initiative
- energy efficiency training through the Canadian Institute for Energy Training (CIET)
- energy management personnel available through On-Site.

On-Site is an initiative supported by the federal government whereby an unemployed professional, with appropriate background and experience, is chosen by a company to go "on staff but not on payroll" for a six month in-house energy management training experience. During this period, he/she receives unemployment insurance.

More than 35 percent of these workers go on permanent staff at the end of the training period and more than two-thirds of them are ultimately employed by others.

- representing industry views, for instance, before the Ontario Energy Board, the Climate Change Task Group, the Natural Gas Externalities Collaborative, and at natural gas utility Demand Side Management consultative meetings.
- an updated Guide on Energy Management for industry
- services of an industrial technology advisor to assist companies or task forces with their energy efficiency problems
- developing industrial energy efficiency case histories
- arranging for Energy Performance Contracting assistance, including third party, off-balance sheet energy efficiency investment financing
- providing monthly industrial energy efficiency news and information in "Plant" newspaper
- regular information exchange with governments, utilities and others on energy efficiency issues, thereby ensuring the energy efficiency activities of these organizations are better coordinated.

CIPEC Services To Industry

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Benefits to Companies Participating in CIPEC

Industry benefits from CIPEC as a result of:

- a coordinated, voluntary industry response to a government priority, such as the Voluntary Challenge and Registry
- a single focus for industry action rather than a company having to appoint representatives to a multitude of association energy committees all trying to attain the same goal
- ensuring accurate, credible and cost-effective data gathering on behalf of industrial sectors
- providing credible analysis of data through CIEEDAC
- a strong industry voice for realistic solutions to complex energy efficiency issues
- annual recognition of industry achievement through Industrial Energy Innovator awards and the CIPEC annual report.

Benefits to Industry Associations from Participating in CIPEC

Industry associations benefit from participation in CIPEC because:

- CIPEC complements industry association mandates to safeguard the interests of their members
- in an era of financial restraint, CIPEC avoids needless duplication of effort
- an industry association can appoint a sector representative to the CIPEC Policy Board and Task Force Council, thereby ensuring its sector's perspectives are taken into account
- CIPEC ensures that the accurate measurement of industrial progress is achieved in a cost-effective way.

Group ISO 9000 Program with Energy Efficiency Performance Measures

To assist small to medium sized manufacturers (SME's) become more energy efficient, CIPEC in cooperation with Ontario Hydro, Consumers Gas, Union Gas, Centra Gas, the Ontario Ministry of Environment and Energy and NRCan have initiated a unique program to identify and then measure energy efficiency performance measures.

SME's use about 8 per cent of the energy consumed by Canadian industry, or about 2 per cent of Canada's total annual energy consumption.

Considering that there are thousands of SME's in Canada, the amount of energy any one company uses is small. But energy costs money and anything which can be done to reduce the amount used per unit of production improves the corporate bottom line.

As well, energy related greenhouse gas emissions, such as carbon dioxide, are of increasing concern to governments, so every effort is being taken to reduce the amount of energy consumed by industry, regardless of size.

Energy, as traditionally defined, is not usually a major operating cost for most SME's. As a result, energy efficiency projects are not usually assigned high priority.

A 1994 Canadian Manufacturers' Association survey suggests, for example, that:

- 79 per cent of manufacturing companies with sales of less than $10 million do not have an energy efficiency program in place, and that
- 61 per cent of all manufacturers, regardless of size, do not have an energy efficiency program in place.

For most companies, it is difficult to measure accurately all of the primary and secondary energy, water and other resources consumed in the manufacturing process.

With these considerations in mind, CIPEC has initiated a pilot project which links implementation of ISO 9000 quality assurance standards to energy efficiency performance measures.

The objective is to enable participating companies to identify ways to reduce the amount of energy and other scarce resources used to produce a unit of production and, thereby, to enhance their competitive position. As well, each company achieves compliance with an ISO 9000 standard.

While costs related to lack of quality are usually thought to be 3% to 5% of operating expenses, a comprehensive economics of quality approach is able to show that real energy costs are usually significantly higher.

ISO 9000 provides a framework within which key processes within an organization can be identified and documented.

Organizations employing this approach can justify energy efficiency investments since paybacks are clearly identified at both an operating and strategic level.

The participating companies, representing diverse industrial sectors, are:

Figure 57

Participating Companies	Products
MCM Nor County Frozen Food, Port Hope, Ontario	frozen vegetables
PaintPlas (1998) Inc., Ajax, Ontario	painted autoparts
Thermal Ceramics, Burlington, Ontario	insulation
Unirope Ltd., Mississauga, Ontario	wire and slings
Alumicor Ltd., Rexdale, Ontario	aluminum doors and windows

Energy is broadly defined to include natural gas, electricity, oil, energy embodied in materials used in the manufacturing process, and water (both process and non-process).

Over a 12 month period, these five companies will implement a quality system meeting all of the requirements of ISO 9002 (1994), plus 3 enhancements:

- energy related economics of quality
- delivery performance
- communication with the customer

How it Works

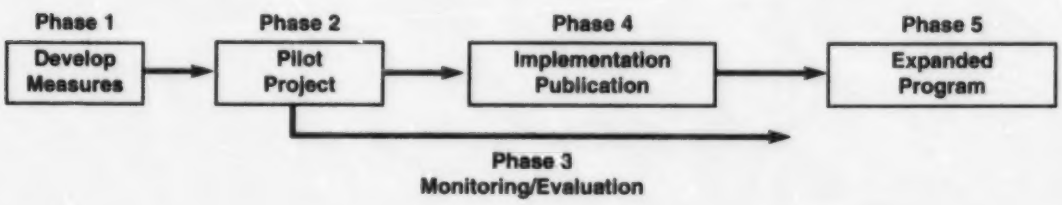
Each company sends up to three representatives to each monthly training session meeting. At the beginning of the program, they were benchmarked against the ISO 9002 (1994) standard. In addition, each company receives a total of ten one-on-one consulting days over a 12 month period.

The implementation part of the program is conducted in a classroom setting once a month over 12 months. Two to three sections of ISO 9002 (1994) are covered at each session, with specific assignments being given to each company for completion before each subsequent session. Classroom instruction takes place in a central location.

At the end of the 12 month period, each company will be audited again against ISO 9002 (1994), using the checklist of the registrar selected by that company.

For an SME, this Group ISO 9000 program with the energy efficiency performance standards achieves two important objectives. First, it helps them implement an ISO 9000 system and achieve registration. Second, it enables companies to identify and control energy and other resource costs.

Figure 58



1995 International Industrial Energy Efficiency Conference

CIPEC

On November 10, 1995, CIPEC sponsored its second International Industrial Energy Efficiency Conference. Over 150 leading executives from Canadian industry attended.

The Minister of Natural Resources Canada, the Honourable Anne McLellan, outlined the federal government's expectation of industry and recognized over 170 Industrial Energy Innovators.

Speakers from Holland, Denmark, the United States and Canada discussed the response to the Climate Change Challenge in their countries.

A highlight of the program was a presentation by Arthur Sawchuk, President and CEO, DuPont Canada, on the projected impact of tougher greenhouse gas emission targets in the post 2000 period on the Canadian economy.

Tom Kierans, President, C.D. Howe Institute, summarized the Conference findings.

The Minister of Environment and Energy for Ontario, the Honourable Brenda Elliott, also addressed the Conference.

Planning is currently underway to hold another International Industrial Energy Efficiency Conference in 1996.

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Appendices

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5. Sample Letter of Cooperation 84

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Appendix 1

CIPEC Industrial Sectors - Standard Industrial Classification (SIC) Codes For Industry

Figure 59 identifies the Standard Industrial Classification (SIC) codes for industry and groups those industrial sectors for which energy use data is collected and reported upon by CIPEC and those which are not.

For 1994, energy consumption data was available for only some industrial sectors, representing about 79 per cent of total industry energy consumption. These are mainly the Tier 1 sectors.

However, for the remaining sectors, detailed 1994 energy consumption data is not available, only a combined total. Some 1993 information is available on some of these sectors from the Annual Survey of Manufacturers (ASM).

StatsCan give a confidence level of more than 90 per cent on the data collected by its ICE survey.

For 1995 data, which will be collected in 1996, the ICE survey will go out to 1936 establishments in all sectors in the CIPEC universe of companies. For purposes of this report, industrial companies are grouped into four categories: Tier 1 "Base"; Tier 1 "New Reporting", Tier 2 sectors and all other sectors on which energy use data is collected but on an aggregated basis.

Figure 59

Tier 1 "Base" 1994 Data ICE Survey by SIC Code		**Tier 1 "Base" 1995 Data ICE Survey by SIC Code**	
Tier I Industry Sectors	**SIC Number**	**Tier 1 Industry Sectors**	**SIC Number**
Aluminum Other Non-Ferrous Smelting and Refining	2951 2959	Aluminum Other Non-Ferrous Smelting and Refining	2951 2959
Cement/Lime	3521, 3581	Cement, Lime, Glass	3521, 3581, 3561
Chemicals	3711, 3712, 3731	Chemicals	3711, 3712, 3731
Metal Mining	611, 612, 613, 614, 615, 616, 617, 619	Metal Mining,	611, 612, 613, 614, 615, 616, 617, 619,2959
Petroleum Refining	3611	Petroleum Refining	3611, 0712
Pulp & Paper	2711, 2712, 2713, 2714, 2719	Pulp & Paper	2711, 2712, 2713,2714, 2719
Steel	2919	Steel	2919

Tier 1 "New Reporting" 1994 Data ICE Survey by SIC Code		**Tier 1 "New Reporting" 1995 Data ICE Survey by SIC Code**	
Chemical Fertilizers	3721	Chemical Fertilizers	3721
Glass	3561		
Non-Metal Mining	621, 624, 625, 629	Non-Metal Mining	621, 622, 623, 624, 625, 629
Oil Sands/Upgrader	0712	Oil Sands/Upgrader	0712

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Appendix 1

Tier 2 Sectors Annual Survey of Manufacturers 1993		Tier 2 Sectors 1995 Data ICE Survey by SIC Code	
Tier 2 Industry Sectors	**SIC Number**	**Tier 2 Industry Sectors**	**SIC Number**
Bakery	107	Bakery	107
Brewery Products	1131	Brewery Products	1131
Dairy	1041, 1042	Dairy	104
Electrical & Electronics	33	Electrical & Electronics	33
Iron Foundries	2941		
Fruit and Vegetables	103	Fruit and Vegetables	103
General Manufacturing • Tobacco • Leather/Allied • Clothing • Furniture • Printing/Publishing • Machinery • Metal Fabrication • All other	 1200 1700 2400 2600 2800 3100 3000 3900	General Manufacturing • Tobacco • Leather/Allied • Clothing • Furniture • Printing/Publishing • Machinery • Metal Fabrication • All other	 1200 1700 2400 2600 2800 3100 3000 3900
Glass	3561	Glass	3561
Meat and Poultry	101	Meat and Poultry	101
Plastics	16	Plastics	16
Rubber	15	Rubber	15
Textiles	1811, 1821, 1829, 1831, 1911, 1912, 1921,1931, 1991, 1992, 1993, 1994, 1995	Textiles	1800, 1900, 3257
Transportation, Motor Vehicles & Parts	3231, 3253, 3254, 3255, 3257, 3289	Transportation, Motor Vehicles & Parts	3231, 3253, 3254, 3255, 3289
Wood Products	2512, 2522, 2592	Wood Products	2500, 2512

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Appendix 1

All Other Manufacturing and Mining Sectors on Which Energy Use Data is Collected but on an Aggregated Basis

Sector	SIC Number
Aluminum Rolling Products	2961
Feed Mills	1053
Gypsum Mining	0623
Other Food Products	1901, 1092, 1093
Petroleum Lubricants	3612
Railway Rolling Stock	3261
Shipbuilding	3272
Sugar and Confectionery	108
Vegetable Oil Mills	1061
Paper Box and Bag	273
Ferro Alloys	2911
Steel Pipe and Tube	292
Other Non Ferrous	299
Truck and Bus Body	324
Wiring Assembly	3252
Other Motor Vehicle accessories and parts	3259
Other transportation equipment	329
Concrete Products	354
Glass Products (ex containers)	3562
Other Non-metallic minerals	359
Other Petroleum and Coal Products	369
Other agricultural products	3729
Soap and Cleaning Compounds	376
Other Chemical Products	379

Sector	SIC Number
Peat Mining	0622
Coal Mining	063
Fish Products	102
Flour, Prepared Cereal, Feed	105
Other Food Products	109
Soft Drinks	111
Distillery	112
Wine	114
Asphalt Roofing	272
Other Converted Paper Products	279
Steel Foundries	2912
Copper Rolling, Casting, Extruding	296
Aircraft	321
Engines and Parts	3251
Plastic parts	3256
Boat building	328
Clay Products	351
Ready mix Concrete	355
Abrasives	357
Lubricating oils and greases	3612
Mixed Fertilizer	3722
Paint and Varnish	375
Toilet Preparations	377

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Appendix 2

Industrial Consumption of Energy (ICE) Survey 1995

Set out below is an outline of the kind of data collected by the ICE survey.

Purpose of Survey

The purpose of this survey is to obtain information on the supply of, and demand for, energy in Canada. This information serves as an important indicator of Canadian economic performance, is used by all levels of government in establishing informed policies in the energy area. In the case of public utilities, it is used by governmental agencies to fulfill their regulatory responsibilities. The private sector also uses this information in the corporate decision-making process.

Confidentiality

StatsCan is prohibited by law from publishing any statistic which would provide information obtained from this survey that relates to any identifiable business, without the previous written consent of that business. The data reported will be treated in strict confidence, used for statistical purposes and published in aggregate form only. The confidentially provisions of the Statistics Act are not affected by either the Access to Information Act or any other legislation. An exception to this general rule of confidentiality is the disclosure, at the discretion of the Chief Statistician, of identifiable information relating to public utilities. This includes enterprises supplying petroleum products by pipeline, and enterprises supplying, transmitting or distributing gas, electricity or steam.

Data Sharing Agreements

To reduce the response burden and to ensure uniform statistics, StatsCan has entered into agreements with various agencies and government departments for the joint collection and sharing of data. The information provided in this survey pertaining to individual respondents cannot be divulged, in any way, by the parties with which StatsCan has agreements. Under Section 12 of the Statistics Act, agreements shall not apply to your return if an officer of your company objects in writing to the Chief Statistician and mails the letter to the Industry Division of StatsCan together with the completed questionnaire.

Completion and Return

Complete and return within 30 days after the end of the reporting period. If you require assistance in the completion of the questionnaire, contact the Energy Section at (613) 951-3522.

Certification

I certify that the information contained herein is complete and correct to the best of my knowledge and belief.

Signature _____

Name of Signer (please print)_____

Official position of signer _____

Name of contact for further information:_____

Telephone ( ) _____ Fax ( ) _____

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Appendix 2
Industrial Consumption of Energy (ICE) Survey 1995

Industrial Consumption of Energy Survey Guide

I. Reporting Instructions

Please report all energy purchased and/or consumed by the industrial establishment. Exclude energy used by contractors and suppliers and for transportation.

For further details on the energy forms, please refer to Energy Forms on page 4.

Coal, Coke and Heavy Fuel Oil: Report volumes purchased and volumes consumed during the period, and inventory at the start and end of period.

Middle Distillates, Natural Gas, Steam, Electricity, Propane and Refuse: Report the volume consumed during the period only.

Wood and Spent Pulping Liquor: Report the volumes consumed during the period irrespective of whether purchased or from plant source.

Other: Report the energy form, the natural unit, the energy content and the volumes consumed during the period.

If the fuel is used to generate steam for sale then report Steam Sales on the front part of the form.

II. Reporting Units

Please report in metric units (to the closest whole unit). The following conversion factors are provided to assist in the completion of the questionnaire.

Coal, Coal Coke, Petroleum Coke, Wood and Spent Pulping Liquor:

Mg = 1 metric tonne = 2,205 pounds
1 (short) ton = 2,000 pounds
To convert short tons to metric tonnes multiply by 0.90719

Middle Distillates, Heavy Fuel Oil, Refuse and Propane:

m3 = 1 cubic metre = 1,000 litres
1 cubic metre = 220 gallons
1 barrel = 34.97 gallons
To convert gallons to cubic metres multiply by 0.004546 To convert barrels to cubic metres multiply by 0.15891

Natural Gas:

103m3 = 1,000 cubic metres
1 cubic metre = 35.3 cubic feet
To convert cubic feet to cubic metres multiply by 0.02833

Steam Purchased or Sold

Gj - Gigajoule = 1,000,000,000 joules
1 Gj = 948,213 BTU's
To convert 1,000 BTUs to Gj multiply by 0.001 055 To convert 1,000,000 BTUs to Gj multiply by 1.055

Electricity Purchased:

MWh = megawatt hours = 1,000 kilowatt hours (Kw.h)

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Appendix 2
Industrial Consumption of Energy (ICE) Survey 1995

Industrial Consumption of Energy Survey Guide

III. Definitions
Please report your energy use according to the following definitions:

(a) Reporting Categories

Energy Content - The factor which converts the energy form from its natural unit to a joule scale on a higher heating value basis (except for Refined Petroleum Products).

Opening Inventory - The quantity of the energy form held at the beginning of the reporting period.

Received During Quarter - Energy purchased or received from outside the plant location. Include energy received from an affiliate company.

Produced Internally - Energy produced by the establishment for its own consumption or for resale.

Sales, Adjustments, Losses - Sale of the energy form to a user outside the plant. The user might be an affiliate or a third party. Adjustments include cyclical billing and timing differences, losses in transportation and metering differences.

Consumed to Produce Steam for Sale - Energy consumed in the production of steam which is then sold to a user outside the plant location.

Consumed to Produce Electricity - Energy consumed in the production of electricity which is then sold to a user outside the plant location.

Consumed as Fuel - The quantity of energy consumed in the production process of the plant.

Consumed for Non-Fuel Use - Energy consumed for uses other than as fuel in the plant production process. This includes products used as petro-chemical feedstock, anodes/cathodes, greases, lubricants, etc.

Closing Inventory - The quantity of the energy form held at the end of the reporting period.

(b) Energy Forms

Bituminous Coal - A dense, black coal, often with well-defined bands of bright and dull materials, with a moisture content usually less than 20 per cent.

Subbituminous Coal - A black coal used primarily for thermal generation with moisture content between 15 and 30 per cent.

Lignite - A brownish-black coal of low rank containing 30 to 40 per cent moisture and volatile matter (also known as brown coal).

Anthracite - A hard, black, lustrous coal containing a high percentage of fixed carbon, a low percentage of volatile matter and little moisture content.

Coal Coke - A hard, porous product made from baking bituminous coal in ovens at high temperatures.

CIPEC

Appendix 2
Industrial Consumption of Energy (ICE) Survey 1995

Industrial Consumption of Energy Survey Guide

Petroleum Coke - A residue that is the final product in the condensation process in cracking. Includes pitch.

Wood - Wood and wood energy used as fuel, including round wood (cord wood), limb wood, wood chips, bark, saw-dust, forest residues, charcoal and pulp waste.

Spent Pulping Liquor - A by-product of the paper making process containing carbohydrate and lignite decomposition products.

Refuse - Solid and liquid waste materials used as a combustible energy source. This would include wastepaper, packing materials, garbage, bagasse, sewerage gas, the burning of contaminates and other industrial, agricultural and urban refuse used to generate electricity for distribution.

Propane - A normally gaseous straight-chain hydrocarbon extracted from natural gas or refinery gas streams. It can also take a liquid form.

Diesel - All grades of distillate fuel used for diesel engines including low sulphur content (with sulphur content lower than 0.05%). Does not include diesel used for transportation on the plant site.

Other Middle Distillates - Includes light fuel oil (nos. 1, 2 and 3), kerosene, mineral lamp oil, stove oil, furnace fuel oil, gas oils and light industrial fuels.

Heavy Fuel Oils - All grades of residual type fuels including low sulphur for steam and diesel engines. Includes fuel oils nos. 4,5 and 6.

Natural Gas - A mixture of hydrocarbons (principally methane) and small quantities of various hydrocarbons existing in the gaseous phase or in solution with crude oil in underground reservoirs.

Steam - A gas resulting from the vapourization of a liquid or the sublimation of a solid, generated by condensing or non-condensing turbines.

Electricity - A form of energy emanating from the movement of positive or negative electric particles accompanied by observable effects as the production of heat, of a magnetic field or of chemical transformations.

Other - Any energy forms consumed not otherwise specified in the questionnaire.

Iron and Steel

Coke Oven Gas - The difference between the thermal value of coal charged to coke ovens less the thermal value of the resultant coke production, with an allowance for heating and losses.

Coal Tar - Organic material separated from coke oven gas evolved during coking operations. A black, viscous liquid including pyridine, tar acids, naphthalene, creosote oil and pitch.

Light Oil - Condensable products (primarily benzene, toluene, xylene and solvent naphtha) obtained during distillation of the coke oven gas, following removal of the coal tar.

CIPEC

Appendix 2
Industrial Consumption of Energy (ICE) Survey 1995

Industrial Consumption of Energy Survey Guide

Refined Petroleum Products

CO2 Factor - The factor used to measure the emission of CO2 in the atmosphere per unit of fuel burned.

Petroleum Coke - Grades of coke produced in delayed or fluid cokers that may be recovered as relatively pure carbon.

Coke on Catalytic Cracking Catalyst - Coke produced from the refining process of breaking down the larger, heavier, and more complex hydrocarbon molecules into simpler and lighter molecules.

Refinery Gas - The remaining unseparated gaseous fractions produced in refinery distillation or cracking processes, after marketable products have been extracted, usually consumed as refinery fuel. It is also known as still gas.

Appendix 2 Industrial Consumption of Energy (ICE) Survey 1995

Energy Form		Energy content (gigajoule per natural unit)	Opening Inventory	Received during period	Produced Internally	Sales, adjustments, losses, etc. (please specify below)	To produce steam for sale	In production of electricity	As fuel	For non-fuel use	Closing Inventory
Solids (in metric tonnes)											
Canadian Coal - Bituminous	2.1										
Subbituminous	2.2										
Lignite	2.3										
Foreign Coal - Anthracite	2.4										
Bituminous	2.5										
Coal Coke - Canadian	3.1										
Foreign	3.2										
Petroleum Coke - Canadian	4.1										
Foreign	4.2										
Wood - (hog fuel, wastewood,bark, etc.)	5.0										
Spent pulping liquor	6.0										
Refuse	7.0										
Liquids (in cubic metres)											
Propane	8.0										
Middle distillates – Diesel	9.1										
Other (light fuel oil, kerosene)	9.2										
Heavy (residual) Fuel oil Canadian	10.1										
Foreign	10.2										
Natural Gas (in thousands)	11.0										
Steam (in gigajoules)	12.0										
Electricity (in megawatt hours)	13.0										
Other *(Please specify)*	14.0										

Appendix 3

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Industrial Energy Innovators - By Sector

There are 178 Industrial Energy Innovators registered with CIPEC (and Natural Resources Canada's Voluntary Challenge Registry) as at December 15, 1995, as follows:

These companies have committed to submit a letter to CIPEC confirming that they will:

- implement energy efficiency measures that make good economic sense
- review energy efficiency performance at least annually
- furnish a brief annual review of its successes and/or achievements using a special CIPEC form designed for this purpose.

Aluminum

Alcan Aluminium Ltd.
Aluminerie de Becancour Inc.
Aluminerie Lauralco Inc.
Reynolds Limited

Cement

ESSCROC Canada Inc.
Lafarge Canada Inc.
North Star Cement
St. Lawrence Cement
St. Mary's Cement Corporation
Tilbury Cement Ltd.
Inland Cement

Chemicals

Canadian Electrolytic Zinc Limited
DuPont Canada Inc.
Harcros Pigments Canada
Nacan Products Limited
Synergistics Industries Ltd.

Electrical/Electronic

Broan Limited
Gould Shawmut Company
Honeywell Limited
Osram Sylvania
Vansco Electronics Ltd.

Food and Beverage

Andres Wines
Coca-Cola Beverages
Labatt Breweries of Canada
Molson Breweries

Food and Beverage

H. J. Heinz Company of Canada
Moosehead Breweries Ltd.
Sleeman Brewing & Malting Co.
Sun-Rype Products Ltd.

General Manufacturing

3M Canada Limited
ABCO Property Management Inc.
Block Drug Company
Canadian Uniform Limited
Champion Feed Services Ltd.
Coyle & Greer Awards Canada Ltd.
Crown Cork & Seal Canada Inc.
Duracell Canada Inc.
Envirogard Products Ltd.
Euclid-Hitachi Heavy Equipment
Federated Co-operatives Ltd.
Garland Commercial Ranges Ltd.
Greif Containers Inc.

General Manufacturing

Kodak Canada Inc.
Kindred Industries
LePage
Maksteel Service Centre
Meridian Clemer Industries Limited
Metroland Printing, Publishing
Oetiker Limited
Polytainers Inc.
Polywheels Manufacturing Limited
PRO-ECO Limited
Renfrew Tap Limited
Simmons Canada Inc.
Starcan Corporation

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Appendix 3

Industrial Energy Innovators - By Sector

General Manufacturing
Huls Canada Inc.
Imperial Wallcoverings
Ingram & Bell Inc.
Interface Flooring Systems
International Paper Industries Ltd.
Jones Packaging Inc.
Morton International Ltd.

Minerals
Chemical Lime Company of Canada
Contintental Lime Ltd.

Mining
Aur Resources
Barrick Gold Corporation
BHP Diamonds Inc.
Brunswick Mining & Smelting
Brunswick Smelting & Fertilizer
Cominco
Falconbridge Ltd.
Fonderie Home - Noranda
Placer Dome Canada Ltd.

Petroleum Refining
Canadian Tire Petroleum
Chevron Canada Limited
Husky Oil Corporation
Imperial Oil
Irving Oil Limited
Novacor Chemicals (Canada) Ltd.

Plastics
AGRA Industries Limited
Canadian General Tower Limited

General Manufacturing
Tramrock EJC Canada Ltd.
Teknion Furniture Systems
VicWest Steel
Viskase Canada Inc.
Wabash Alloys Ontario
Woodbridge Group
Wyeth-Ayerst Canada Inc.
Westcast Industries Inc.

Minerals
Global Stone Corporation
Hillsborough Resources Limited

Mining
Hemlo Gold
Hillborough Resources Limited
Iron Ore Company of Canada
Mines et exploration Noranda Inc.
Noranda Metallurgy Inc.
Quebec Cartier Mining Company
Teck Corporation
INCO Limited
Westmin Resources Limited

Petroleum Refining
Parkland Refining Ltd.
Petro-Canada
Safety-Kleen
Shell Canada Limited
Suncor (Sunoco Group)
Syncrude Canada Ltd.
Ultramar Canada Inc.

Plastics
Husky Injection Molding Systems

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Appendix 3

Industrial Energy Innovators - By Sector

Pulp and Paper
Avenor Inc.
Canfor Corporation
Cascades Paperboard International
Donohue Inc.
Eurocan Pulp & Paper Co.
Lake Utopia Paper
MacMillan Bloedel Limited
Kruger Paper Inc.

Steel
Dofasco
IVACO Inc.
Slater Steels HSB Division
Stelco Inc.
Stelco Fasteners Ltd.
Stelco-McMaster Ltee

Textiles
Agmont Inc.
Albarrie Canada Limited
C.S. Brooks Canada Inc.
Canada Hair Cloth Co. Limited
Coats Bell
Coats Patons
Collingwood Fabrics
Collins & Aikman
Consoltex Inc.
de Ball Canada Inc. (J.L.)
Dominion Textiles Inc.
Fabrene Inc.

Transportation
Accuride Canada Inc.
Hawker Siddeley Canada Inc.
Altek Automotive Castings
CAMI Automotive Inc.
Chrysler Canada
Eaton Corporation
Ford Motor Company of Canada
Freightliner of Canada Ltd.
General Motors of Canada Ltd.

Pulp and Paper
Maritime Paper Products Limited
Quno Corporation
Rainy River Forest Products Inc.
Repap Enterprises Limited
St. Marys Paper Ltd.
Stora Forest Industries Limited
Weyerhaeuser Canada

Steel
Stenfil Ltée
Stelpipe Ltd.
Stelwire Ltd.
Sydney Steel Corporation
Welland Pipe Ltd.

Textiles
Glendale Yarns Inc
Glenelg Textiles Limited
LaGran Canada Inc.
Lincoln Fabrics Ltd.
Nova Scotia Textiles Limited
Peerless
The Britex Group
The Cambridge Towel Corporation
Union Felt Products Inc.
The Stewart Group Limited
Vagden Mills Limited
Vitafoam Products Canada Ltd.
Weavexx

Transportation
Kelsey Hayes Canada Ltd.
McDonnell Douglas Canada Ltd.
Navistar International Corporation
Orion Bus Industries Ltd.
Prevost Car Inc.
Rockwell International
Russell Metals
Toyota Motor Manufacturing Can.
Westcast Industries Inc.
Volvo Canada Ltd.

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Appendix 4

Recording Industry's Progress

Government records industry's actions to reduce energy consumption and related greenhouse gas emissions through:

- the National Inventory of Greenhouse Gas Emissions
- the Climate Change Voluntary Challenge and Registry (VCR).

The National Inventory of Greenhouse Gas Emissions

The National Inventory of Greenhouse Gas Emissions is maintained by Pollution Data Branch, Environment Canada. Its first report, "Canada's Greenhouse Gas Emissions: Estimates for 1990", was issued in 1992.

This inventory of greenhouse gas emissions is the official record of all Canadian emissions and is used to make international comparisons and for monitoring Canada's 1992 Rio Accord commitment.

Efforts are underway to ensure that the database and methodology used by Environment Canada and those used by CIEEDAC, to determine GHG emissions, are compatible.

Climate Change Voluntary Challenge and Registry (VCR)

The Voluntary Challenge and Registry was established in 1995 by the federal and provincial governments as part of Canada's commitment to reduce energy use and to stabilize GHG emissions at 1990 levels by the year 2000.

The Minister of Natural Resources Canada is responsible for the VCR. It is designed to register tangible, voluntary commitments to achieve Canada's GHG stabilization goals.

There are four alternative ways a company can become registered in the VCR, including registering:

- directly with the VCR
- through CIPEC, as part of the industrial energy innovator program
- through its trade association, or
- a combination of the above.

The VCR is not an official record of industry's achievements rather it is a catalogue of actions which can be used, accessed on Internet and/or by the Minister of Natural Resources Canada to illustrate industry's commitment to the Voluntary Challenge.

Industrial Energy Innovators

The Industrial Energy Innovator (IEI) program is a joint initiative of CIPEC and Natural Resources Canada. It promotes the implementation of cost effective energy efficiency measures and related carbon dioxide emission reductions in a systematic fashion within the manufacturing or mining sectors.

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Appendix 4

Recording Industry's Progress

Industrial Energy Innovators

Registering as an Industrial Energy Innovator records the commitment of a manufacturing or mining company to implement energy efficiency measures that make good economic sense, to review energy efficiency performance at least annually, and to furnish a brief annual review of its successes and/or achievements using a special CIPEC form designed for this purpose.

An Industrial Energy Innovator receives a plaque, signed by the CIPEC Chairman and the Minister of Natural Resources Canada, in recognition of the company's leadership in improving energy efficiency and thereby helping Canada meet its commitment under the 1992 Rio Accord.

A company qualifying as an Industrial Energy Innovator can, at its request, be automatically registered as such in the VCR, but this does not require a company to report additional information to the VCR.

The Registration Process

The following describes and compares how a company can become registered with the VCR or as an Industrial Energy Innovator.

VCR

Letter of Intent

Direct to:

Sue Kirby
Senior Director
Voluntary Challenge and Registry Program
Natural Resources Canada
580 Booth Street
Ottawa, Ontario K1A 0E4

An organization submits a Letter of Intent to the Registry signed by the CEO:

- clearly indicating the organization's commitment to respond to the Challenge
- identifying in broad terms the types of activities being considered
- providing a time-frame for submitting the organization's action plan
- providing some indication of general goals or, ideally, a greenhouse gas (GHG) emission reduction target

Industrial Energy Innovator

Letter of Intent

Direct to:

Chuck Hantho
Chairman,
Canadian Industry Program for
Energy Conservation (CIPEC)
75 International Boulevard
Toronto, Ontario M9W 6L9

A manufacturing or mining company submits a letter confirming that it will:

- implement energy efficiency measures that make good economic sense
- review energy efficiency performance at least annually
- furnish a brief annual review of its successes and/or achievements using a special CIPEC form designed for this purpose

Appendix 4

CIPEC

VCR Action Plan

An Action Plan should be submitted and provide information on net GHG emission reductions planned in the following main reporting categories:

- own emissions
- partnerships
- off-sets

The Action Plan should include:

- base level emissions or closely related proxies such as a base level of energy consumption by fuel types
- forecasts or projections of GHG emission levels
- goal(s), target(s) and/or objective(s) and time frames
- actions (measures to attain goals or objectives) Further Information
- commitment to continued development of plans and ongoing assessment

Progress Reports

They should be submitted annually to the Registry and include:

- a brief description of the ongoing objectives and methodology
- to the extent possible, calculated or measured results in terms of GHG emissions reductions and/or interim measures of progress such as changes in energy use, noting any variance from action plans previously submitted
- any new or revised actions planned; any new or revised goals or objectives

Further Information

Contact:
Nick McCartney
Voluntary Challenge and Registry Program
Natural Resources Canada
580 Booth Street
Ottawa, Ontario K1A 0E4
Telephone: (613) 996-6698
Fax: (613) 947-6799

Industrial Energy Innovator Action Plan

Six months after becoming an Industrial Energy Innovator, CIPEC will communicate with the company seeking information on progress being made in responding to its energy efficiency undertaking and, if possible, obtain a copy of the company's energy efficiency action plan screened to remove any sensitive or confidential information.

Progress Reports

This should be submitted annually and include a brief review of an Industrial Energy Innovator's successes and/or achievements in the energy efficiency area, utilizing a form furnished by CIPEC for this purpose.

Further Information

Bent Larsen
Executive Director
CIPEC
75 International Boulevard, 4th Floor
Toronto, Ontario M9W 6L9
Telephone: (416) 798-8155
Fax: (416) 798-9174

CIPEC

Appendix 5

Letters of Cooperation (LOC's)

Over the past two years, CIPEC has entered into Letters of Cooperation (LOCs) with 15 associations and a number of individual companies.

The associations are:

Aluminum Industry Association
Automotive Parts Manufacturing Association
Canadian Chemical Producers' Association
Canadian Gas Association
Canadian Manufacturers' Association
Canadian Petroleum Products Institute
Canadian Plastics Institute
Canadian Steel Environmental Association
Canadian Pulp and Paper Association
Cement Council of Canada
Canadian Textile Institute
Mining Association of Canada
Electro Federation Canada
Motor Vehicle Manufacturers Association
Canadian Lime Institute

The companies are:

McCain Foods Limited
Moosehead Breweries Limited
Molson Breweries
Labatt Breweries of Canada

Other LOCs are in process. Set out below is a sample Letter of Cooperation

"By this letter of cooperation, (LOC), the Association in collaboration with CIPEC, undertakes to encourage its member companies to develop and implement plans for energy efficiency as a means of becoming more competitive, thereby participating in helping to meet Canada's carbon dioxide emission stabilization goals.

The Association will work with its member companies to:

1. Appoint a CEO to the CIPEC Policy Board.
2. Establish an industry sector Task Force within CIPEC to develop sector targets and to develop plans to continually improve energy efficiency in relation to such targets.
3. Provide input to reports and studies prepared by or for CIPEC or government on sector energy efficiency improvement performance or potential.
4. Identify industry sector opportunities for the promotion of industrial energy efficiency, including training and technology.
5. Distribute CIPEC material supporting energy efficiency, as appropriate.
6. Support research activity aimed at improving the efficient use of energy.
7. Promote participation in the Industrial Energy Innovators initiative. (This is a recent addition).

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Appendix 5

Letters of Cooperation (LOC's)

CIPEC will provide:

1. Sector data on energy efficiency and/or other criteria mutually agreed upon by the sector Task Force and CIPEC.

2. Administrative support to the Task Force in response to its needs.

3. Public recognition of Industrial Energy Innovators as well as the Association for their leadership in improving energy efficiency.

4. Access to CIPEC support service, including Training, On-Site Human Resources, Sector Studies, Energy Efficiency related financing, Technology Development, and Task Force Marketing.

5. Promotion of the progress of industry sectors and industry-at-large in meeting the goals of CIPEC and Canada in terms of improving energy efficiency and helping to meet Canada's carbon dioxide emissions stabilization goals.

6. Communication linkages with government agencies and other related associations on energy efficiency matters.

Further, both parties recognize that: a) this voluntary agreement may be terminated at any time by either party, and b) as a participant, the Association shall be entitled to use the logo and other intellectual property of CIPEC in its promotion of industrial energy efficiency.

Accepted and agreed to this _____ day of _____, 1994

_____ _____

Chuck Hantho, Chair
Policy Board, CIPEC

Association Chair

CIPEC

For More Information about CIPEC and its activities, write, fax or call:

Bent Larsen, Executive Director
CIPEC Secretariat
4th Floor, 75 International Boulevard
Toronto, Ontario
M9W 6L9
Tel: (416) 798-8155
Fax: (416) 798-9174

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